CERAMIC ABSTRACTS and THE BULLETIN

OF THE

AMERICAN CERAMIC SOCIETY

OCTOBER 15, 1943

MONTHLY PUBLICATION DEVOTED TO THE ARTS AND SCIENCES RELATED TO THE SILICATE INDUSTRIES

MEMBERSHIP ROSTER

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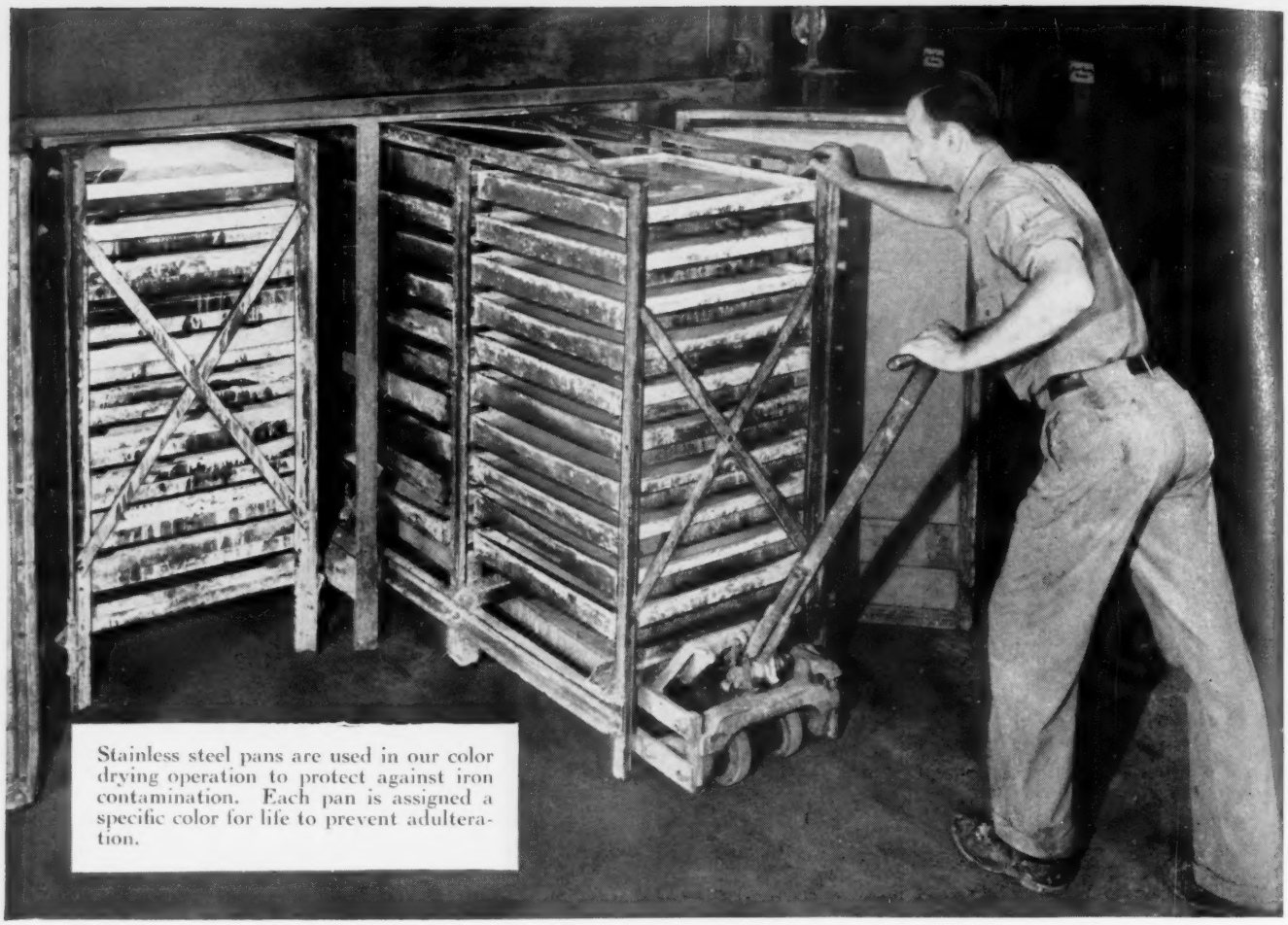

Stainless steel pans are used in our color drying operation to protect against iron contamination. Each pan is assigned a specific color for life to prevent adulteration.

Color Grit Problem Solved before it Starts

Production schedules are sometimes upset by color grit, for these hard, oversize color particles create unsightly, bumpy surfaces on glass and ceramic ware, to the detriment of quality and sales.

Years ago, we recognized that uncontrolled drying caused color grit—and we did something about it. So whenever the question of dehydrating water-ground colors comes up, we say that our colors go direct from grinding mill into stainless steel pans which are then placed in a specially engineered cabinet equipped to circulate heated air under perfect thermostatic control. Constant air movement and even temperature remove all water and leave a soft, dry color that pulverizes completely, without a trace of grit.

Scientific drying is only one of many strictly controlled processes our technologists have devised to give our customers top quality colors. Why not benefit from their broad knowledge of color problems and how to solve them? Learn how they cooperate. Your letter will receive prompt, confidential attention.

B. F. DRAKENFELD & CO., Inc.
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Factory and Laboratories: Washington, Pa.
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Back the Attack . . . Buy War Bonds

DRAKENFELD

YOUR PARTNER IN SOLVING COLOR PROBLEMS

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Lancaster

THE SCIENTIFIC COUNTER-CURRENT RAPID BATCH MIXING SYSTEM

Dry Mixing is "Under Control" with LANCASTER MIXERS

Dry mixing of ceramic bodies is modern. In terms of processing, it offers advantages of improved economy and efficiency.

Peak efficiency with Dry Mixing is assured by Lancaster Mixers. Batch ingredients are scientifically controlled during the entire mixing operation. Formulas are properly and rapidly developed by a mixing-mulling treatment that is uniform, thorough and intensive.

Lancaster Mixing means increased productivity from both manpower and materials. Here's why:

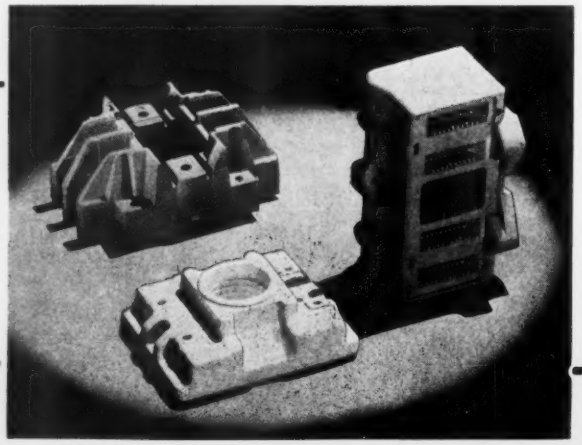
1. Elimination of many operations increases output per man . . . per machine. Efficient design of the "Lancaster" Mixer minimizes manpower necessary to operate the mixer itself.

2. Small, special batches can be efficiently prepared and waste avoided.

3. A wide range of plasticity with accurate control of moisture is provided.

4. Uniform distribution of each ingredient is dependably achieved.

"Lancaster" Mixers are widely employed in America's expanding steatite production.



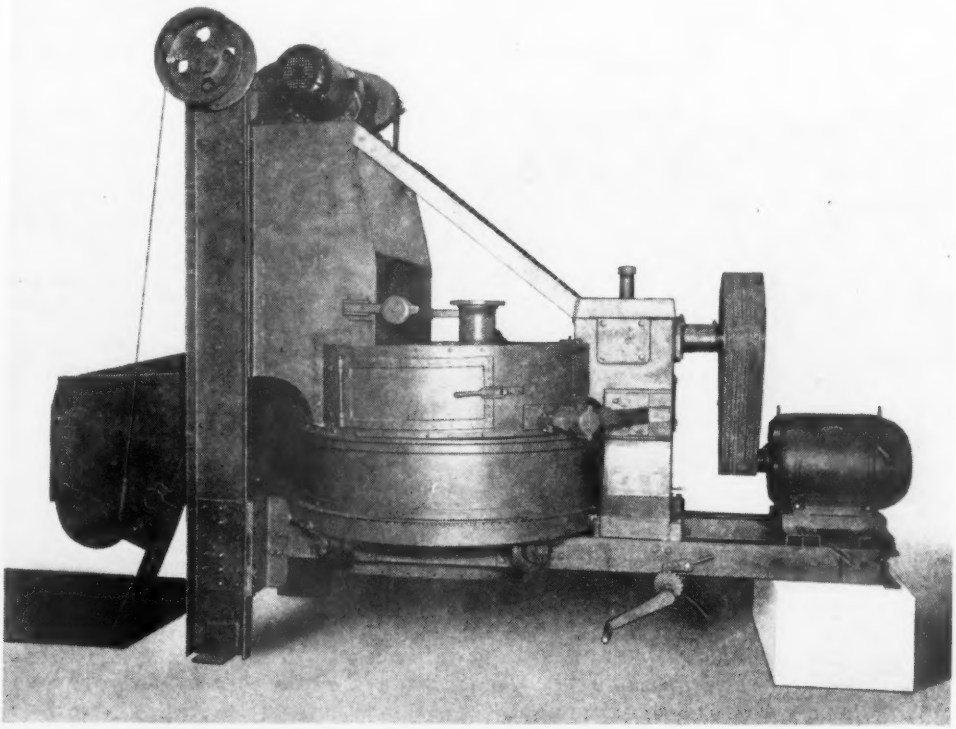
Electrical porcelains produced by dry mixing with Lancaster Mixers.

MIXERS

Scientific Mixing in the "Lancaster"

Mixing in the "Lancaster" Mixer is conducted by counter-current action on a horizontal plane. The clockwise rotating pan conveys material into a mixing area established off-center of the pan diameter by counter-clockwise rotating mixing tools. Ever-changing activity of the material develops a strongly vibrating life in the batch. The "Lancaster" is the ONLY batch mixer that provides counter-current mixing PLUS balanced mulling action.

Investigate the advantages which dry mixing with "Lancaster" Mixers can provide for you.



"Lancaster" Mixer, Symbol EAG-4 closed pan type, fitted with separately driven full batch elevator hopper.

LANCASTER IRON WORKS, INC.
BRICK MACHINERY DIVISION
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Kryolith
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NATURAL GREENLAND CRYOLITE

AND YOUR PRODUCTS OF THE FUTURE

New and radically different refrigerators, ranges, washing machines and similar products are now definitely part of the post-war plans of every progressive member of the glass, enamel and ceramic industries.

The refrigerator illustrated is just an example. A famous industrial artist designed it. Its handsome, snow-white enamel is chip-proof—and is so remarkably durable that the beauty of this appliance will continue through years and years of service. Moreover, the attractiveness and utility of this refrigerator are enhanced by the use of glass for shelves, compartment doors, handles and other trim.

To help manufacture these good things of the future, many manufacturers will depend on Kryolith. Kryolith is the *only* refined natural fluoride Greenland ore sold in North America for use as a flux and opacifier. Here are the properties of Kryolith which will aid *you* in boosting output and improving quality: low melting point, for speedier reduction of the batch—a powerful, *lasting* fluxing action—the ability to dissolve coloring oxides—excellent opacification.

Insist that the frit you buy is genuine Kryolith. Supplied in 500 lb. barrels and 100 lb. bags. Write for complete information.

KRYOLITH IN THE WAR

Kryolith is an important bonding material in resinoid grinding wheels used to finish alloy steels on tanks, ships and other fighting equipment.

CHEMISTRY IS THE KEYSTONE OF INDUSTRY

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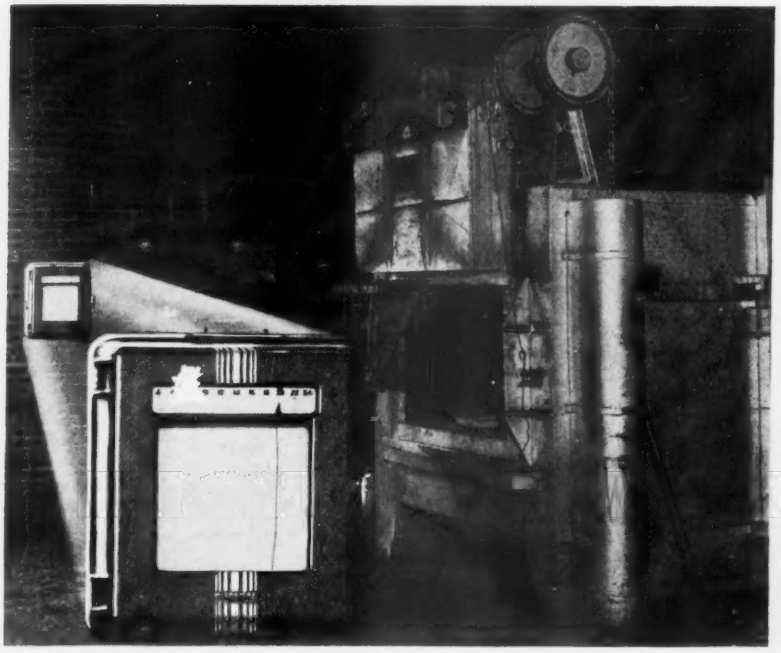

Ceramic products are fired, under Micromax Control, in this Lindberg electric furnace.

Overnight Firing Is Dependably Controlled When Furnace Is Micromax-Equipped

Taking charge late every afternoon of a fresh furnace-load of work, the Micromax Pyrometer shown above regulates furnace temperature through the night so dependably that practically every part will, in the morning, meet the requirements of the industry.

Heating is in three stages. Micromax first brings and holds the work to a comparatively low temperature. The next stop is higher and then a long jump, to about 2000 °F, brings the parts to firing temperature. This must be within 20 degrees (one per cent), of the theoretically correct point, and the furnace must be uniform throughout to within a very few degrees.

Because this firing is at night, when the control pyrometer has no supervision, the furnace users wanted extreme dependability; and they selected Micromax as the pyrometer. Performance has justified their choice. The pyrometer brings their big furnace to temperature with extreme accuracy, and its broad chart proves the product is fired with quality precision.

But Maybe You Don't Fire Small Articles

Micromax is as dependable in the making of other ceramic materials as in this case. Models meet any plant personnel's preferences; see Catalog N-33A, "Micromax Thermocouple Pyrometers," Catalog N-33B, "Micromax and Speedomax Rayotube Pyrometers" and N-00A, "Micromax Electric Control."

Jrl Ad EN-0720(3)

Temperature Checking Is Easier With L&N Direct-Reading Optical

This man, checking temperatures as a glass tank is fired up, finds his job easier, faster and more accurately done because he has a L&N Optical Pyrometer which reads directly in degrees Fahrenheit.

Gone is the calibration chart used with the earlier Optical. Gone is a third of the weight. And gone, too, is much of the work involved in measuring

Glass plants find L&N Optical Pyrometer convenient.

temperatures in hard-to-get-at-places, because the new Optical comes more quickly to balance, hence keeps the man on the tank a shorter time. Write for Catalog N-33D, "Optical Pyrometer."

Look To L&N For:

Micromax Controllers, Recorders & Indicators
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QUALITY BALL CLAYS
PRODUCE BETTER WARE

THE SAME HIGH STANDARDS

MAINTAINED

PROMPT SHIPMENTS,

UNIFORMITY, DEPENDABILITY

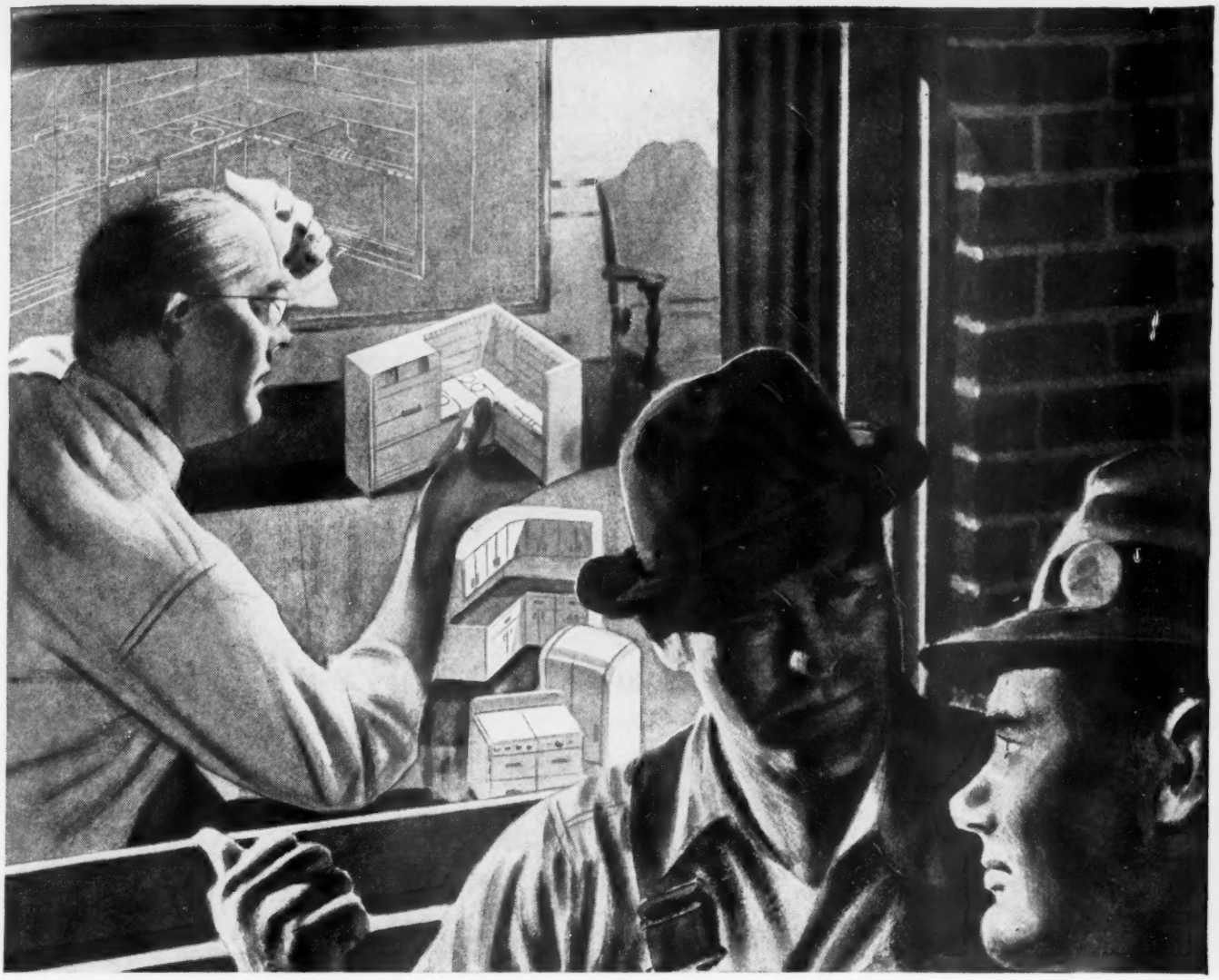
THE SAME QUALITY BALL CLAYS

ARE PRODUCED

AND SHIPPED ON TIME

KENTUCKY CLAY MINING COMPANY, Inc.

MAYFIELD - - - - KENTUCKY



"The Old Man's working on his post-war kitchens"

SURE, the "Old Man" has war work to do. He put in eleven hours on it today. Now it's a late, sultry night in September and he's studying some post-war kitchen models that his product engineer made up.

Will porcelain enamel resume its place in this kitchen equipment of the future? Will range, refrigerator, sink and other products — built-in or otherwise — be porcelain finished *inside and out?* Only the porcelain enameling industry can answer that question. There's a BIG JOB ahead of us, that's certain.

We've made up our minds to this, however: that as producers of the original ARMCO Enameling Iron, and improvers of it ever since, we intend to keep pace with your efforts to make porcelain enamel an even more desirable finish than it was before the war.

Can we help you in any way? May we work with your product-and-materials men in improving both the metal base and the application? Our long experience and all our research facilities are at your disposal. The American Rolling Mill Company, 2381 Curtis Street, Middletown, Ohio.

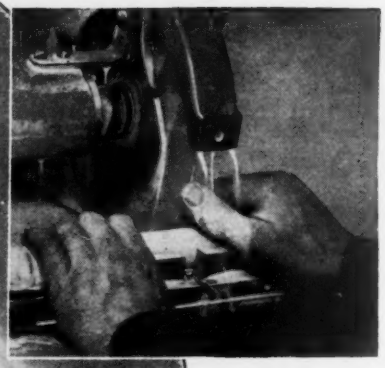
ARMY E NAVY

THE AMERICAN ROLLING MILL COMPANY

PORCELAIN ENAMEL ON ARMCO INGOT IRON

We have this confession to make...We've been so enthused by all the cutting advantages and modern applications of DI-MET metal body diamond abrasive wheels that we have almost forgotten to tell you of their SAFETY!

Yet with high operating speeds, this is an *outstanding* feature!



Imagine cutting teeth so hard and sharp they whiz right through glass, ceramics, porcelain, quartz and all other similar hard, brittle, non-metallic materials—yet *won't cut a finger*. And even more—DI-MET Rimlock wheels, being metal discs with diamonds bonded in the outside periphery, can't shatter, can't crack, can't powder into abrasive dust with attendant silicosis hazards . . . offer complete protection to the operator!

We'd like to show you how well DI-MET diamond abrasive wheels mill, groove, slice or cut off hard, brittle, non-metallic materials—and do it with exceptional safety! Won't you send a sample of your material? One of our many blade types may solve a war production problem or do a job better than ever before.

FELKER MANUFACTURING CO.

1111 Border Avenue **Torrance, Calif.**

MANUFACTURERS OF DIAMOND ABRASIVE WHEELS

In Planning Plant Improvement . . . Consider

The Modern HARROP CIRCULAR TUNNEL KILN

It gives you these important advantages to help meet tomorrow's production demands: concentration of loading and unloading at one location . . . eliminates necessity of transferring cars . . . fits most economically in many plant lay-outs . . . easily controlled by hand or automatic-control firing . . . adaptable to the firing of all types of ceramic ware . . . is labor-saving and fuel-saving.

Contact us today whether your future needs indicate a new kiln, a drier, a complete new plant or more efficient production. Harrop Ceramic Service Co., Columbus, Ohio.

STRAIGHT TUNNEL KILNS
(Direct or Indirect-Fired)

CIRCULAR TUNNEL KILNS
(Direct or Indirect-Fired)

CERAMIC DESIGN

PLANT CONSTRUCTION

PLANT EQUIPMENT

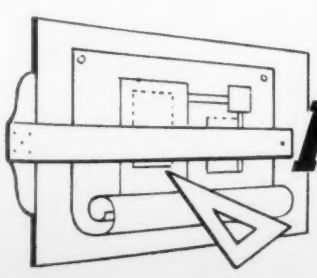
KILNS and DRIERS

FUEL BURNING EQUIPMENT
(Coal-Oil-Gas)

PLANT PROBLEMS

RESEARCH

OUR CATALOG IN CDB CERAMIC DATA BOOK



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Consistently Successful Service For A Quarter Century

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Distinctive Color helps manufacturers get better identification of products

Ceramic colors by Ferro are finding new uses in the industrial field. One of the latest, and possibly most interesting, is their use in helping manufacturers of grinding wheels and tool tips get better identification of their products.

By blending Ferro Body Stains with the abrasive, a permanent, even color is obtained. This in no way impairs the cutting qualities of the grinding tools, yet makes them stand out against competitive items.

Ferro Body Stains are made with the same care as are all other Ferro Ceramic Colors. These include Glaze Stains, Overglaze Colors, Underglaze Colors, Glass Colors and Enamel Oxides. All are products of extensive research and have been subjected to exhaustive field tests before being offered to the trade.

We believe you'll like Ferro colors . . . and the way they handle. You'll also like the wide choice of priority-free pigments now available.

Because we would like you to try these colors, we'll gladly furnish full information *and samples* on request. Just drop us a line on your company letterhead. We'll do the rest.

FERRO

ENAMEL CORPORATION
COLOR DIVISION
CLEVELAND · OHIO

CONTROL AND YOU Save!

Below is pictured the Hays Automatic Tank Pressure Controller Type CDE-X which is typical of Hays Controllers. It is provided with a manual adjusting knob accessible from front of case for setting the Controller for the differential pressure to be maintained. Indicator and scales indicate differential or furnace pressure for which the Controller is set.

SAVE in time, materials, fuel, man-power; minimize spoilage and guarantee a better, more uniform product.

Hays Instruments for the Ceramic Field include air and gas measuring, indicating and recording Gages, draft and pressure Indicators and Recorders, Gas-Air Ratio Meters, Oil-Air Proportioning Meters, Combustion Meters, CO_2 Recorders and complete Systems of Automatic Combustion Control.

Bulletins 43-552 and 43-591 explain the application of Instruments and Controllers to Ceramic furnaces, Glass tanks, Pottery kilns and Enameling furnaces with schematic drawing of a complete system of Automatic Control of Combustion and Pressures—sent free upon request.

SPECIAL NOTE! Be sure to send for your Free Copy of Bulletin 43-552 "Instrumentation and Control of Ceramic Furnaces, Pottery Kilns, Glass Tanks and Enameling Furnaces."

The HAYS CORPORATION
SINCE 1901 COMBUSTION INSTRUMENTS AND CONTROL
MICHIGAN CITY, INDIANA, U.S.A

Volclay PUREST WYOMING

BENTONITE

THE USE OF VOLCLAY BENTONITE IN THE CLAY WORKING INDUSTRY IS CONSTANTLY GROWING. SMALL AMOUNTS IMPROVE THE WORKABILITY AND FIRED PROPERTIES OF CLAY PRODUCTS.

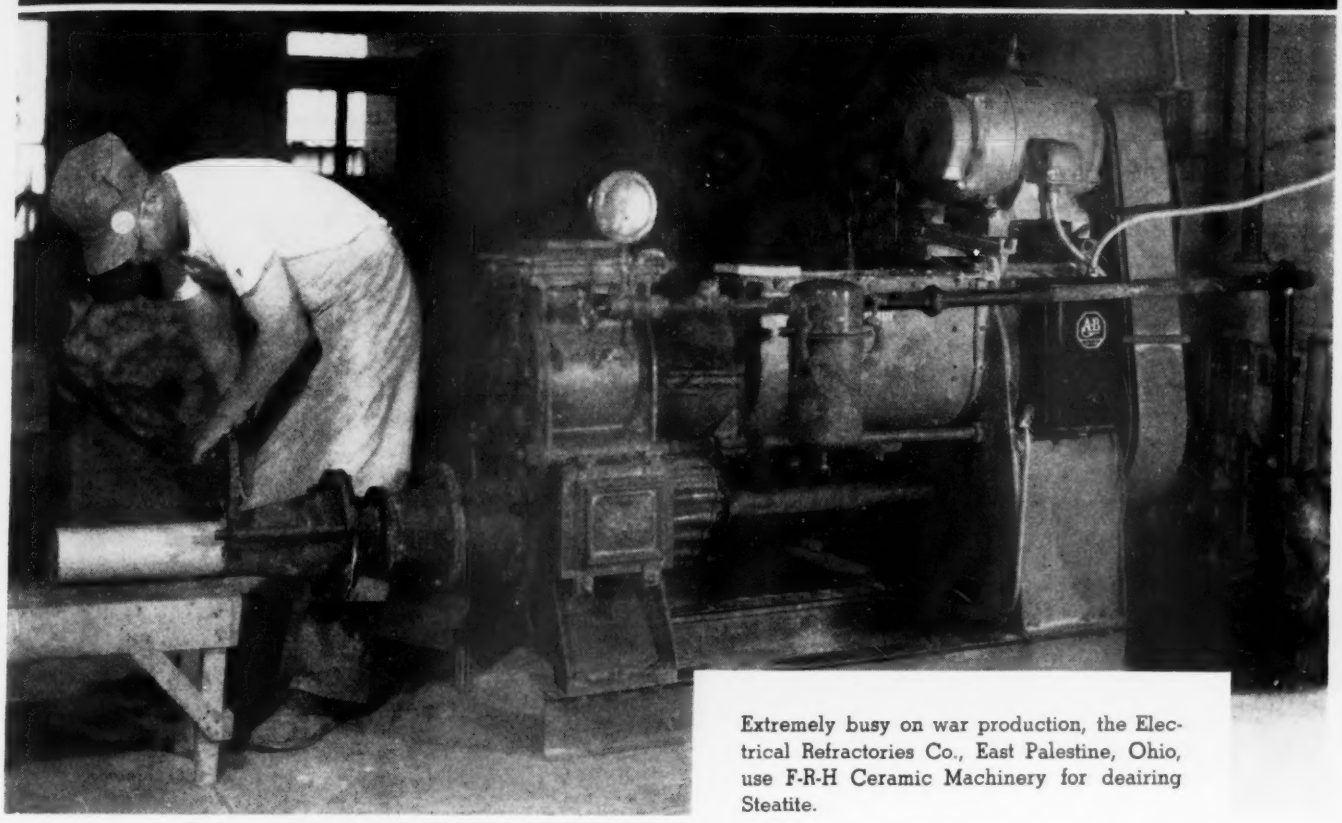
FOR SEVENTEEN YEARS THE TOP QUALITY COLLOIDAL BENTONITE

American Colloid Company

Three plants

Main Office—363 W. Superior St., Chicago, Illinois

OWNER SATISFACTION . . .



Extremely busy on war production, the Electrical Refractories Co., East Palestine, Ohio, use F-R-H Ceramic Machinery for deairing Steatite.

AND REPEAT ORDERS PROVE IT!

Would you buy another? When the answer is "yes" it's the best evidence of merit in any piece of equipment. Production economies provided by efficient and durable F-R-H DeAiring Machines result in many repeat orders for this ceramic machinery.

Typical of the recommendations from owners of F-R-H machines is the one from The Electrical Refractories Co. ". . . we like it—we bought the second machine." Owner satisfaction, backed by a repeat order, is the proof of high quality.

On all ceramic assignments, F-R-H has consistently given satisfaction to owners. Investigate these machines that increase production, lower operating costs and bring higher net income returns. Models and sizes for all clay working needs.

THE FATE-ROOT-HEATH CO.

Plymouth, Ohio, U. S. A.

BUY MORE U. S. WAR BONDS!

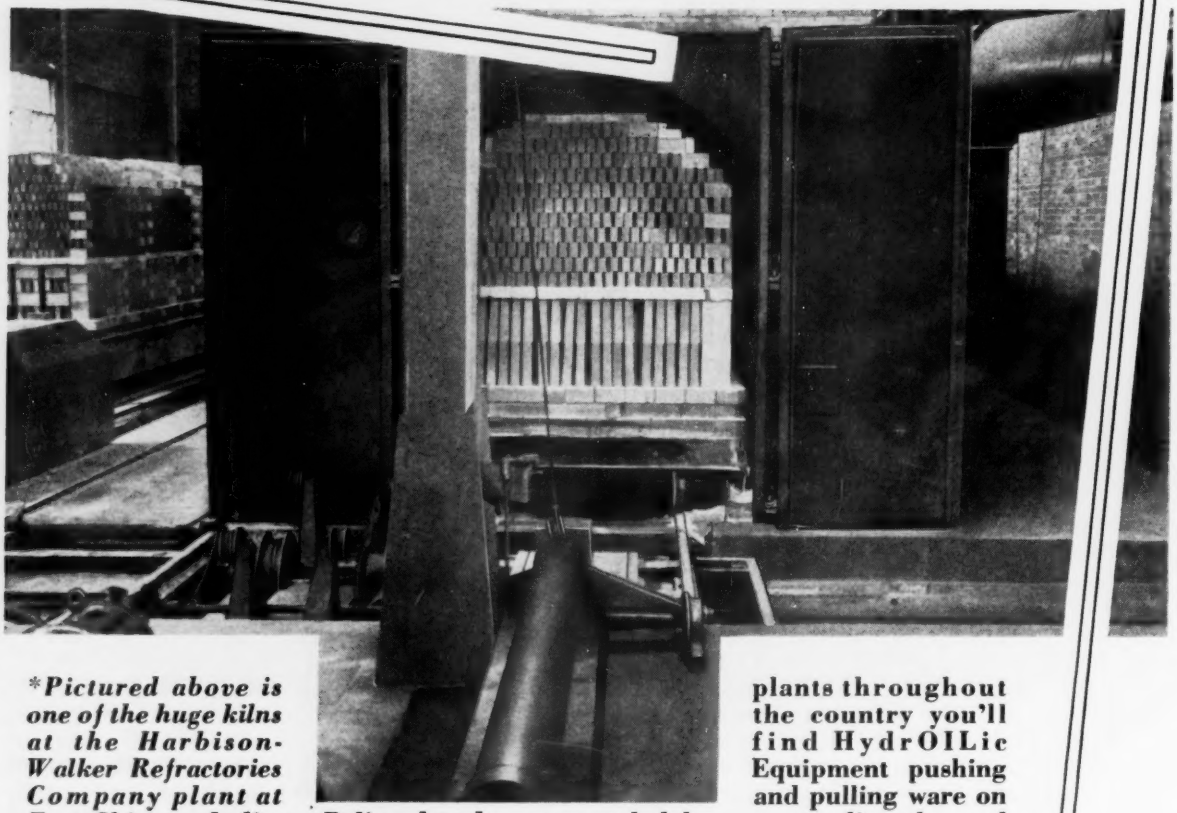
PLYMOUTH Industrial Locomotives

F·R·H

Clay Working Machinery

SILVER KING Industrial Tractors

Pushing the BIGGEST kiln-cars through the WORLD'S LARGEST Kiln★



**Pictured above is one of the huge kilns at the Harbison-Walker Refractories Company plant at East Chicago, Indiana. Believed to be the world's largest, it is 536 feet in length, and accommodates the biggest kiln-cars known to be used in this country. Tops of the cars are slightly more than eight feet square, and each car is capable of holding 4000 nine-inch brick. These large cars are propelled through the kiln by a HydrOILic car pusher, part of which can be seen in the foreground.*

SIZE makes no difference in the efficiency with which HydrOILic Equipment handles ceramic jobs. In leading plants throughout the country you'll find HydrOILic Equipment pushing and pulling ware on cars and slabs . . . extruding clay and feeding it into automatic machines . . . elevating cars for easier handling of ware . . . pressure-packing cargoes of brick to prevent breakage in transit. These are only a few of the tasks HydrOILics does *better* in the ceramic industry. In fact, through the smooth, flexible accuracy of oil-transmitted power, HydrOILics has won a wide reputation as the Ceramic Industry's *right hand*. Let Denison HydrOILic Engineers work with you on production and movement-control needs.

THE DENISON ENGINEERING CO.
1116 Dublin Rd. Columbus 16, Ohio

HydrOILics INDUSTRY'S RIGHT HAND

DENISON EQUIPMENT in APPLIED HydrOILics TRADE-MARK

RELIABLE REFRACTORIES

MADE FROM

KENTUCKY CLAYS

FOR

GLASS TANK FURNACES
GLASS POT FURNACES
REGENERATORS
TUNNEL KILNS
PERIODIC KILNS
GAS MACHINES
FRIT FURNACES
CHEMICAL PRODUCT FURNACES
MUFFLE FURNACES
LEHRS

Consult Us On Your Refractory Problems

THE IRONTON FIRE BRICK CO.
Reliable Refractories
IRONTON, OHIO

THE ORTON
PRECISION-MADE CONE

Accurate in Shape
Uniform in Structure

Pugged and deaired to a uniform mass, machine cut and automatically fitted into a die in the mold, the machine-made cones are constant in quality.

The machine does not change in technique nor does the dough change in consistency during a day's run as is inevitable in the hand making of cones.

ORTON MACHINE-MADE STANDARD PYROMETRIC CONES ARE ACCURATE IN SHAPE AND UNIFORM IN STRUCTURE

They Stand for Quality Control

THE EDWARD ORTON, JR. CERAMIC FOUNDATION

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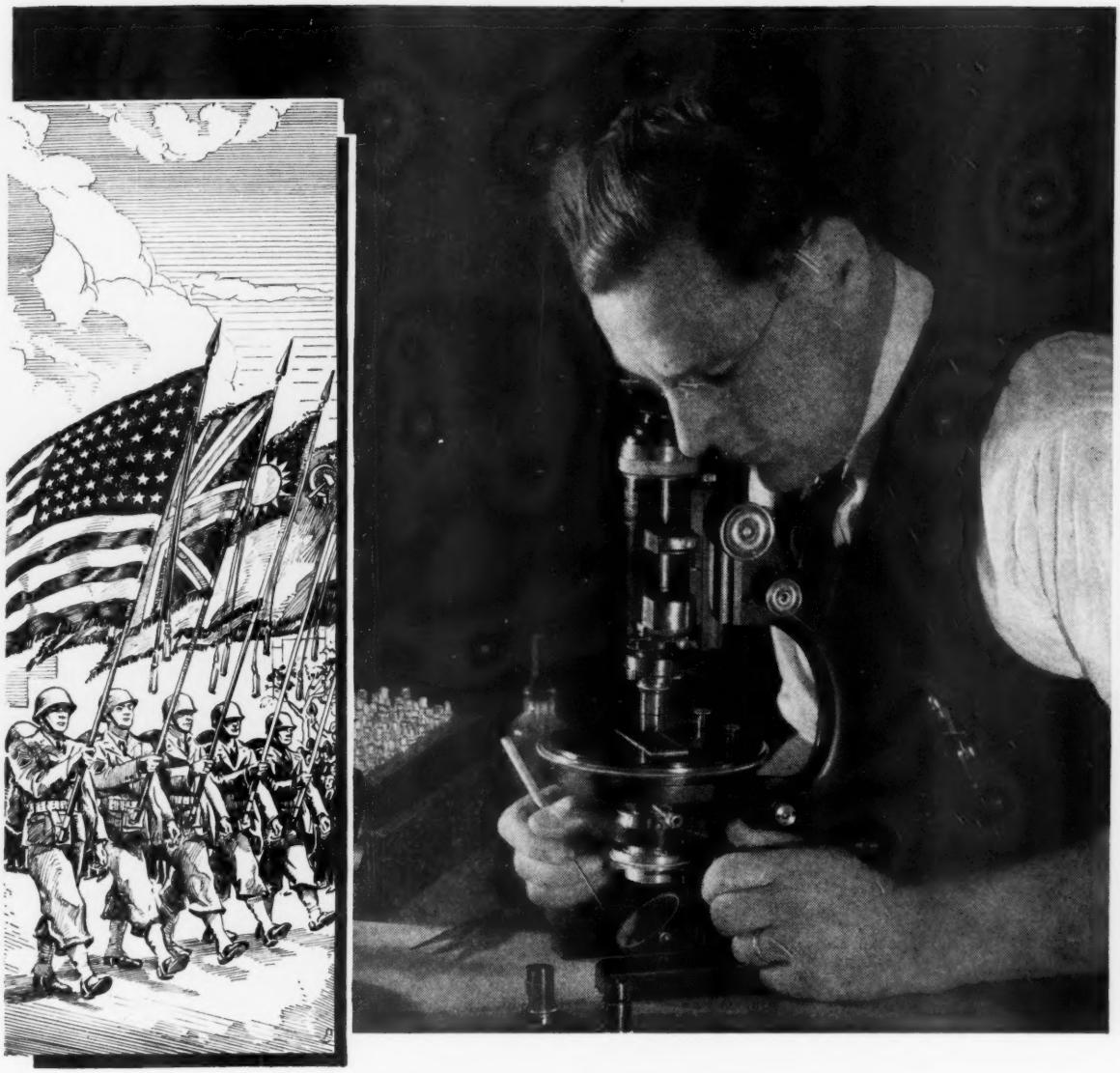


Chemistry's Part in Victory

In *ten* thousand and one ways, the chemist is bringing the day of Victory closer and closer. Through multiplied production of military explosives . . . through discoveries of new processes, new synthetics, new compounds, new alloys . . . *chemistry* is speeding the complete mobilization of our war machine and the nation's needs to keep it running.

Spencer's contribution in this achievement lies in the field of optical science and in supplying instruments of many types indispensable in the sphere of chemistry.

Optical instruments are so vital to war and public health that the nation's needs absorb practically all of Spencer's greatly increased production.

ARMY E NAVY

Spencer LENS COMPANY
BUFFALO, NEW YORK
SCIENTIFIC INSTRUMENT DIVISION OF
AMERICAN OPTICAL COMPANY

PIONEER CLAY

Used by the trade since 1901

American China Clay of high strength
and low shrinkage used in

VITRIFIED CHINAWARE

SEMI-PORCELAIN DINNERWARE

and for other ceramic purposes

High plasticity value
Excellent working properties • White fired color

Water Washed • Controlled Uniformity

GEORGIA KAOLIN COMPANY

EST. 1901

Mines and plants Dry Branch, Ga.

MAIN OFFICE

433 No. Broad St., Elizabeth, N. J.

ABINGDON FELDSPAR

Division of

Abingdon Sanitary Manufacturing Co.

Abingdon, Ill.

A Special Message

To Ceramic Plants In The North Central States

To enable our country's transportation systems to better carry the increased load placed upon them by war shipments, our Government has requested that hauls of freight be shortened to the utmost. The short distance from our shipping point at Abingdon, Ill., to ceramic plants in the North Central States enables us to comply with this necessary measure, and also to give prompt service to our customers.

Mines

We own and operate our own Feldspar mines in the heart of the Black Hills District of South Dakota. Here we have large deposits of excellent quality crude Feldspar, insuring users of a practically unlimited supply.

Mining operations are under our own supervision. In order to insure proper selection we mine by hand labor.

Efficiently Produced

Abingdon crude Feldspar is carefully hand selected at the mines and again hand-cobbed at our own pulverizing plant in Abingdon. Strict laboratory supervision assures uniformity.

Pulverizing

The proper chemical and physical characteristics are present in our spar so blending or control treatment is unnecessary in its production.

Our pulverizing plant is under direct laboratory supervision. Mill equipment, most modern in every respect, enables production of Feldspar of uniform screen analysis.

Uses

Abingdon Feldspar is a high quality Potash Feldspar for use in Bodies, Glazes and Enamels. We have used it in our own production of high grade vitreous china, china art ware and sanitary fixtures for over 18 years.

Outstanding in purity and unvarying uniformity Abingdon Feldspar is being used regularly in the manufacture of the following, in plants throughout the country—

China Sanitary Ware	Electrical Porcelain
Artware	Floor and Wall Tile
Dinnerware	Stoneware
Enameled Sheet Steel	Terra Cotta
Enameled Cast Iron	Glazed Brick

Reserve Stocks

Large reserve stocks of pulverized Feldspar, kept at our plant at Abingdon, Ill., is another factor which enables us to make prompt shipment.

Samples and Information

Investigate the merits of Abingdon Feldspar. Testing samples and complete information sent upon request.

Here's Another Recommended Value—

BUY U. S. WAR BONDS

ABINGDON FELDSPAR

— PRODUCT OF —

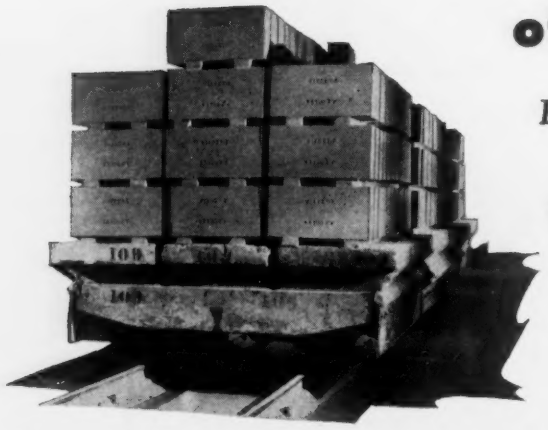
ABINGDON SANITARY MANUFACTURING CO.

To Speed the Day

of Victory and Peace

Refractories are making possible the production of

TANKS · BOMBS · SHIPS



TO PRODUCE the vital implements of war, the industries of the United Nations must have fire brick and other refractory materials. Without fire brick to line the boilers and furnaces of industrial plants, heat could not be controlled for useful production. By means of refractories, crude ores are turned into the steel, copper, aluminum and magnesium that mean ships, tanks, airplanes, guns and ammunition. Gasoline and oil for our fighting forces are refined and made useful by the aid of fire brick. And the ships that must carry men and supplies to all parts of the world depend primarily upon refractories to make possible the creation of energy.

Today, A. P. Green is producing the refractory materials that are as essential to the war effort as they are indispensable to industry in times of peace.

While our United Nations' war effort needs vast quantities of our materials and is getting them—the A. P. Green Fire Brick Company has increased production to such proportions that it is able to meet the needs of our many export customers. Only restrictions on ocean cargo space limit our shipments to you. But you can be sure of this—whenever and wherever shipping space is available, A. P. Green products will be delivered to you without delay.

PT BOATS: Marine engines for these raiders which help keep sea lanes open to American shipping are made of alloy steel from furnaces lined with fire brick.

BOMBS: In furnaces lined with A. P. Green refractories, metals are refined and processed for making these weapons of aerial warfare.

TANKS: Conversion of crude iron into armor plate for tanks is accomplished in furnaces lined with A. P. Green fire brick and other refractory materials.

The U. S. Maritime "M" Pennant, awarded to the A. P. Green Fire Brick Co. for outstanding achievement in the production of refractory materials essential to the shipbuilding program of the Maritime Commission.

Increased Production Provides for Regular Customers

While Uncle Sam needs our materials and is getting them . . . the A. P. Green Fire Brick Company planned ahead — with plant expansion and the development of advanced methods of increasing production, to such proportions that greatly increased shipments have been made during the past year — actually 59% more than the previous high pre-war year — truly an outstanding job of supplying both the needs of our war effort and the requirements of our many regular customers.

A. P. GREEN
FIRE BRICK COMPANY
MEXICO, MISSOURI

the First Name in Refractories

Fireclay Brick . . Super Duty Brick . . High Alumina Brick . . Special Refractory Tile Insulating Fire Brick . . Plastic Fire Brick . . Mortars . . Maintenance Coating Materials Refractory Castables . . Oil Burner Combustion Chambers

A. P. GREEN FIRE BRICK CO.
MEXICO, MISSOURI, U.S.A.
STOCKS IN THE PRINCIPAL CITIES OF THE AMERICAS

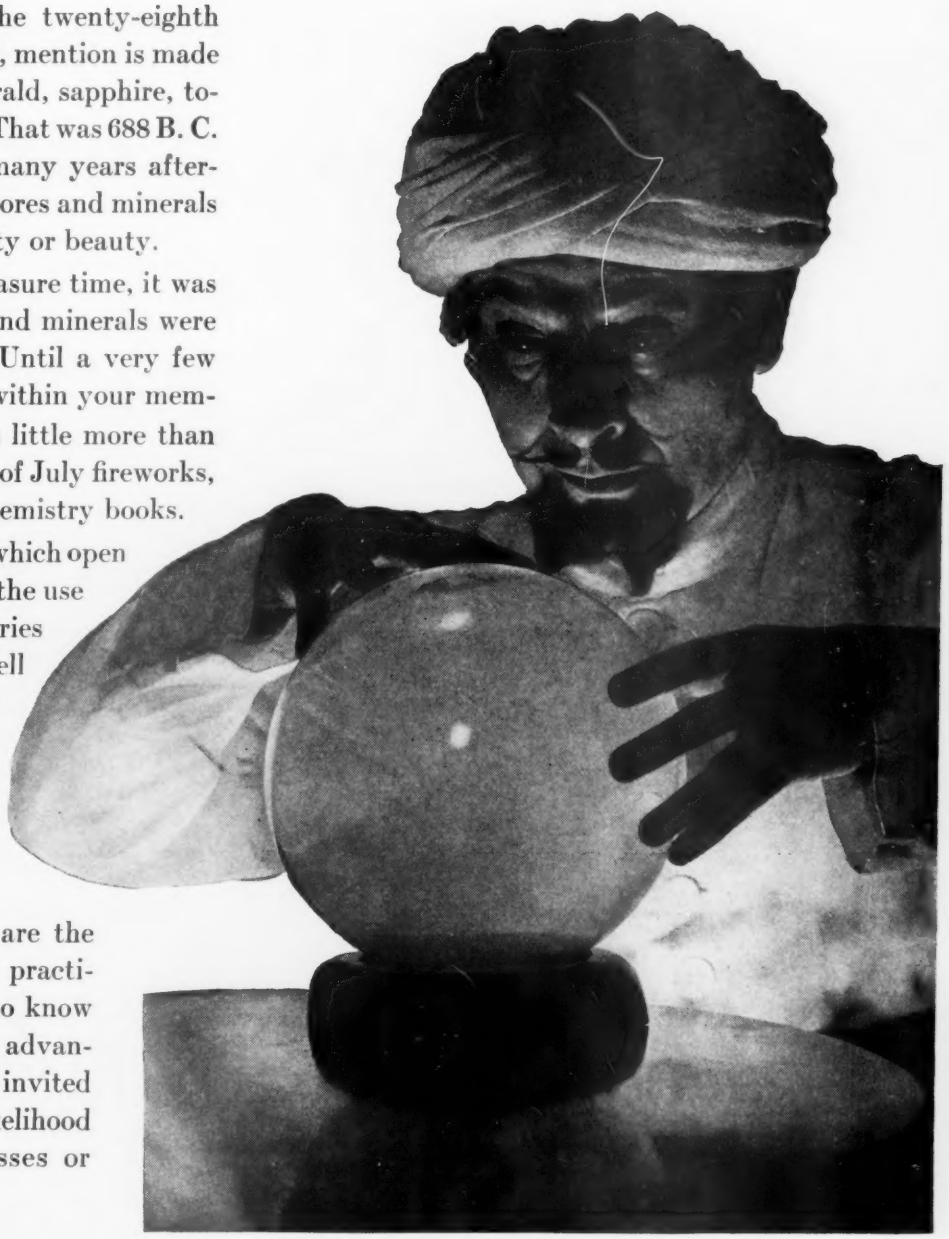
Wanted: More Crystal-Gazers

In the thirteenth verse of the twenty-eighth chapter of the Book of Ezekiel, mention is made of diamond, beryl, onyx, emerald, sapphire, topaz and other precious stones. That was 688 B. C. For many years before and many years afterward, the world's crystals and ores and minerals were prized only for their rarity or beauty.

In fact, as mineralogists measure time, it was scarcely yesterday that ores and minerals were discovered to be of real use. Until a very few years ago, for example—well within your memory—abundant strontium was little more than a red glow reserved for Fourth of July fireworks, lithium an obscure name in chemistry books.

Today, there are discoveries which open greater and wider horizons for the use of ores and minerals; discoveries which affect your industry as well as scores of others. Foote, by reason of long experience and extensive research into ores and minerals and chemicals, is in the forefront of these developments.

You who in your industry are the "crystal-gazers" of the most practical kind, you whose job it is to know what new thing can be used advantageously in your products, are invited to write us. There is good likelihood that Foote products, processes or research can benefit you.



Foote
MINERAL COMPANY

A Step Ahead in Industrial Ores and Chemicals

CATCHING UP WITH STRONTIUM SALTS

Ceramists are keeping their eyes peeled for the results of investigations on strontium salts. Our own studies, and researches conducted by a noted university with our collaboration, indicate that non-toxic strontium salts may reduce or replace barium and lead in dinnerware glazes. Strontium salts aid in fining and help to increase complexity. Strontium glasses can be fired in a sulphur atmosphere without reacting with the sulphur. On the economic side, strontium salts will be available in abundant quantities at reasonable prices. If these inducements appeal to you, why not let Foote engineers discuss the possibilities with you?

PHILADELPHIA • ASBESTOS • EXTON, PENNSYLVANIA
Home Office: 1614 SUMMER STREET, PHILADELPHIA, PA.
West Coast Representative: GRIFFIN CHEMICAL CO., San Francisco, California
English Representative: ERNEST B. WESTMAN, LTD., London, England

A 15-Year Record Of Glass Progress

THE statistics below give the performance data of *one* glass furnace through eleven consecutive fires, over a period of fifteen years. It is a story of progress made possible by steady advances in furnace design and operation, and the use of better refractories.

Please note the increases in *life* and *production* —the decreases in *costs*. . . . It is especially significant that despite the wide utilization of more expensive refractories to withstand the abuses of far higher temperatures, the total cost of repairs per-ton-of-glass has dropped more than 60%.

The Corhart Refractories Company is proud to have helped in proving that *a modern glass furnace can turn out tonnages that were impossible in older furnaces—and do it with very large savings in repair costs per unit of glass products.*

Corhart Refractories Company, *Incorporated*, 16th and Lee Streets, Louisville, Kentucky.

PERFORMANCE DATA FOR ONE TANK OVER A PERIOD OF FIFTEEN YEARS

DATE →	JAN. '28 JULY '28	SEPT. '28 MAY '29	JUNE '29 APRIL '30	JUNE '30 SEPT. '31	NOV. '31 DEC. '32	FEB. '33 MAR. '34	MAY '34 DEC. '35	JAN. '36 JUNE '37	JULY '37 NOV. '38	FEB. '39 MAR. '41	APRIL '41 JULY '43
MATERIAL IN FURNACE	All Clay Tank—15" Sidewalls	All Clay Tank—15" Sidewalls	Corhart Bridge wall 15" thick M.E. Sidewalls	Corhart Bridge wall 15" thick M.E. Corhart Tank Course and 15" thick Clay Lava Course M.E.	All Corhart Tank—12" M.E. Sidewalls	All Corhart Tank—12" M.E. and 100 sq. ft. M.E. Bottom	All Corhart Tank—12" M.E. and 1 Corhart M.E. Bottom	All Corhart Tank—12" M.E. and 1 Corhart M.E. Bottom	All Corhart Tank—12" M.E. and 1 Corhart M.E. Bottom	All Corhart Tank—12" M.E. & R.E. and all Corhart M.E. Bottom	All Corhart Tank—12" M.E. & R.E. and all Corhart M.E. Bottom
MELTING AREA (SQ. FT.)	834	834	834	834	834	834	834	834	834	834	834
TOTAL DAYS LIFE	212	246	300	482	405	413	600	500	514	738	813
TOTAL OPERATING DAYS	175	201	249	365	330	335	500	437	418	634	738
TONS GLASS DELIVERED	6648	8620	10356	16400	17561	19873	39134	47753	40861	52037	77485
TONS GLASS PER OPERATING DAY	37.99	42.89	41.59	44.93	53.22	59.32	78.27	109.27	97.75	82.08	104.99
SQ. FT. MA. PER TON GLASS PER DAY	21.9	19.4	20.3	21.8	17.8	16.5	10.7	7.8	8.7	8.2	7.94
TOTAL TONS COAL USED	4292	4810	6215	10540	10640	10208	19154	17176	17557	27179	32338
TOTAL TONS COAL USED ON OPERATING DAYS	2732	4187	5445	8630	9232	8892	17024	16002	15884	24544	30512
BTU PER TON GLASS DELIVERED	103349×10^2	89425×10^2	86802×10^2	86880×10^2	86785×10^2	82371×10^2	80089×10^2	61691×10^2	70665×10^2	85833×10^2	72495×10^2
COAL EQUIVALENT AT 13150 BTU PER LB. (70% PRODUCER EFFICIENCY) (LBS. COAL PER LB. GLASS)	561	486	526	526	526	447	435	335	384	472	394
NATURAL GAS EQUIVALENT AT 1000 BTU CU. FT. (PER TON GLASS)	10335	8943	9680	9688	9679	8227	8009	6169	7066	8683	7249
FUEL OIL EQUIVALENT AT 150,000 BTU PER GALLON (PER TON GLASS)	68.9	59.6	64.5	64.5	64.5	54.9	53.4	41.1	47.1	57.9	48.33

NOTE: This tank had a 42" metal line in all campaigns. The ware manufactured was flint containers. The fuel was Island Creek Coal (13,150 BTU per pound).

Ceramic Abstracts Section

Compiled by

THE AMERICAN CERAMIC SOCIETY

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PERIODICAL REFERENCE: The name of the periodical appears in italics, followed by the volume (bold-faced), issue number (in brackets), page numbers, and year (in parentheses).

Vol. 22 **October 15, 1943** **No. 10**

Abrasives

Cincinnati radius grinding attachment. ANON. *Machinery* [N. Y.], **49** [11] 226 (1943).—A radius-grinding attachment has been designed by the Cincinnati Milling Machine Co. especially for use on the Cincinnati No. 2 cutter and tool grinder. R.H.B.

Delta chip-breaker grinder. ANON. *Machinery* [N. Y.], **49** [10] 192 (1943).—A machine for grinding the chip-breaker groove in carbide-tipped tools has been brought out by the Delta Mfg. Co., Milwaukee, Wis. R.H.B.

Grinding tungsten-carbide steels. ANON. *Edgar Allen News*, **21** [250] 115–16 (1943).—The outer rim or periphery of a cup grinding wheel must never be used for carbide tools as it produces a certain amount of concavity which is harmful to efficiency. The grinding wheel should rotate in the same direction as the tool, moving slowly across its face with an amount of pressure less than that used for a high-speed steel tool to avoid heating cracks. Wet grinding is recommended, but if dry grinding is necessary the wheels should be kept open and true to shape. The tool must not be cooled suddenly with water if it has become too hot. Vibration and chatter must be eliminated from the grinding operation. Diamond lapping is recommended for giving a final edge, as it increases the serviceable life of the tool. Diamond grinding wheels should not be used for rough grinding as they remove material rapidly. M.HA.

Handstoned tools cut better. ANON. *Mill & Factory*, **33** [1] 112 (July, 1943).—Cutting tools that are handstoned after the regular grinding with the usual tool-room grinding wheels give a 100 to 300% increase in production with less power consumption. The method consists in first grinding the tool with a coarse wheel, continuing the grinding with a fine wheel, and then finish dressing the cutting edge with a handstone. This gives an unbroken cutting line at the junction of the two planes forming the cutting edge. A.G.B.

Jones bench grinder. ANON. *Machinery* [N. Y.], **49** [11] 240 (1943).—A No. 135 bench grinder and polishing machine is manufactured by the Jones Engineering Co., Ellwood City, Pa. R.H.B.

Metal cutting with abrasive wheels. W. B. HEINZ. *Trans. Amer. Soc. Mech. Engrs.*, **65** [1] 21–29 (1943).—This analytical investigation was undertaken to determine whether or not the manner in which an abrasive cutoff wheel is operated might have an important effect upon the amount of service obtainable during the life of each wheel and whether or not the maximum possible cutting rate might also be subject to improvement by better methods of operation. The geometrical relationships involved in cutting round stock were determined, with the stock rigidly clamped and with the stock rotating in each direction relative to the wheel rotation. Based on the geometry of the several conditions, predictions are made of the advantages which might be gained by a well-organized experimental program. Illustrated. F.G.H.

New grinding machine for carbide tools. ANON. *Machinery* [N. Y.], **49** [10] 163 (1943).—A new carbide tool grinding machine that makes unnecessary the employment of skilled labor for this work has been developed through the cooperation of the Carboloy Co., Inc., Detroit, Mich., and the Edison General Electric Appliance Co., Chicago, Ill. The grinding wheel oscillates while the tool is held stationary at the correct angle. The pressure is applied through air-pressure mechanisms. The output per grinding machine is approximately six times that obtained with former methods of tool grinding. R.H.B.

Preparation and use of diamond dust for cutting and polishing. W. STEIN. *Gemmologist*, **12**, 61–64 (Nov., 1942); *Science Abs.-A*, **46**, 234 (Jan., 1943).—The extent to which operations performed with the aid of diamond-charged tools differ from other methods is theoretically considered. In cutting and drilling, the action of the grains is a chipping process, and the efficiency of the diamond is due to its ability to stand a high degree of compression without disintegrating and to retain a cutting edge longer than other abrasives. The uniformity in size of the abrasive particles plays a great role in the efficiency of the process. The action of polishing has been explained (1) as a very fine form of grinding, and (2) as involving a degree of plastic flow on the surface being polished. H.K.R.

Securing fine surfaces by grinding: III. H. J. WILLS. *Machinery* [N. Y.], **49** [10] 171–73 (1943).—W. describes the factors governing fine surface quality and the means by which this quality can be obtained. The subjects dis-

cussed include wheel self-sharpening, dressing the wheel for fine grinding, and choosing the correct abrasive, grain size, and bond. For Part II see *Ceram. Abs.*, **22** [9] 149 (1943). R.H.B.

Slitter wheel grinder. ANON. *Mill & Factory*, **33** [1] 150 (July, 1943).—A compact machine for use on a portable stand or bench is described. The grinding-wheel face is 4 in. in outside diameter by $^3/_8$ in. The machine is designed to give quick and exact clamping of the work into grinding position. It is manufactured by the Johnstone Engineering & Machine Co., Downingtown, Pa. A.G.B.

Vonnegut plate grinder. ANON. *Machinery* [N. Y.], **49** [10] 186 (1943).—The Vonnegut Moulder Corp., Indianapolis, Ind., has brought out a G.R.C. type plate grinder which is available with a 10-in. diameter segmental abrasive chuck driven by a $7^1/_2$-h.p., 1800-r.p.m. motor or a 14-in. chuck driven by a 10-h.p., 1200-r.p.m. motor. R.H.B.

Wet grinding improved by wetting action compound. R. W. MITCHELL. *Machinery* [N. Y.], **49** [10] 204 (1943).—When a wetting compound is added to a cutting fluid, the solution clings to the wheel, the work is wet all over, chatter marks and burned streaks are reduced, and the grinding operation is speeded up materially, with the result that the finished surfaces are smoother. The wetting agent for wet grinding should be stable, nonfoaming, and noncorrosive. R.H.B.

Willey's carbide-tool grinders. ANON. *Machinery* [N. Y.], **49** [11] 236 (1943).—The Willey's Carbide Tool Co., Detroit, Mich., has brought out an improved Model 30 carbide-tool grinder, equipped for dry and wet grinding. R.H.B.

Yoder roll-grinding machine. ANON. *Machinery* [N. Y.], **49** [10] 194 (1943).—The Yoder Co., Cleveland, Ohio, has developed a new machine for grinding the rolls used in roll-forming machines. R.H.B.

PATENTS

Abrasive. A. WACKER GES. FÜR ELEKTROCHEMISCHE INDUSTRIE G.M.B.H. Belg. 436,549, Oct. 31, 1939.—The abrasive comprises hard grains imbedded in a plastic binder such as vinyl or acrylic acid polymers. M.Ho.

Abrasive article and method of manufacturing. N. P. ROBIE (Carborundum Co.). U. S. 2,327,218, Aug. 17, 1943 (Oct. 30, 1939).—An abrasive article comprising abrasive grains and a binder comprising a polymer including a substantial proportion of an ester of an acrylic acid.

Abrasive-faced wheel. E. C. JARM AND LE VERNE VERZIER (Lea Mfg. Co.). U. S. 2,327,900, Aug. 24, 1943 (Jan. 9, 1941).

Apparatus for manufacture of grinding wheels. L. H. MILLIGAN AND R. H. LOMBARD (Norton Co.). U. S. 2,326,381, Aug. 10, 1943 (Nov. 19, 1936; Aug. 2, 1940).

Cylindrical grinding machine. C. G. FLYGARE AND S. S. MADER (Norton Co.). U. S. 2,327,255, Aug. 17, 1943 (March 7, 1941).

Diamond abrasive article. H. R. HOUCHINS (Carborundum Co.). Can. 413,514, June 29, 1943 (Sept. 22, 1941). G.M.H.

Diamond holder for use in profiling grinding wheels and for like purposes. G. E. MOORE. Brit. 554,875, Aug. 5, 1943 (March 5, 1942).

Dresser for grinders. L. M. JONES AND H. E. ANDERSON. U. S. 2,327,272, Aug. 17, 1943 (Jan. 27, 1941).

Finishing stone. F. H. KEMP (Mid-West Abrasive Co.). U. S. 2,328,459, Aug. 31, 1943 (Sept. 29, 1941).

Flexible abrasive articles, e.g., sandpaper, and method of making. A. H. STEVENS (Minnesota Mining & Mfg. Co.). Brit. 554,920, Aug. 5, 1943 (July 21, 1941).

Grinding machine-carriage reciprocating mechanism. C. C. ALVORD (Norton Co.). U. S. 2,327,486, Aug. 24, 1943 (July 5, 1941).

Grinding machines for gear teeth, etc. POWER PLANT CO., LTD., AND H. A. PIETRKOWSKI. Brit. 554,874, Aug. 5, 1943 (Feb. 25, 1942).

Grinding wheel. S. S. KISTLER (Norton Co.). U. S. 2,327,846, Aug. 24, 1943 (Aug. 19, 1939; Jan. 16, 1941).—A grinding wheel comprising abrasive grains, acid insoluble organic bond holding the abrasive grains together, and a filler of polyvinyl chloride.

Grinding wheel speed control. C. C. ALVORD (Norton Co.). Can. 413,380, June 22, 1943 (July 6, 1942; in U. S. Oct. 23, 1941). G.M.H.

Honing tapered bores. R. J. MITCHELL AND G. E. MARBAIX, LTD. Brit. 554,466, July 21, 1943 (Sept. 29, 1941).

Method and apparatus for dressing involute grinding-wheel profiles. J. J. OSPLACK (Vinco Corp.). U. S. 2,326,795, Aug. 17, 1943 (Sept. 28, 1940).

Slideway grinders or other machine tools incorporating an adjustable slide. A. SCRIVENER, LTD., AND A. SCRIVENER. Brit. 554,521, July 21, 1943 (March 3, 1942).

Surface-finishing machinery. A. H. DALL, HANS ERNST, AND SOL EINSTEIN (Cincinnati Grinders, Inc.). U. S. 2,327,022, Aug. 17, 1943 (Aug. 15, 1940).

Surface-grinding machine. H. A. SILVEN (Norton Co.). Can. 413,381, June 22, 1943 (July 6, 1942; in U. S. Oct. 14, 1941). G.M.H.

Art and Archeology

Dishes and dining. CARLTON ATHERTON. *Bull. Amer. Ceram. Soc.*, **22** [9] 311–12 (1943).

Glasshouse friggers: Prince Rupert's Drops and the Bologna Phial; rolling pins. T. TAYLOR SEAGO. *Pottery Gaz.*; reprinted in *Glass Ind.*, **24** [4] 157, 175; [8] 339 (1943). A.P.

ISCC-NBS color names. DOROTHY NICKERSON. *Bull. Amer. Ceram. Soc.*, **22** [9] 306–10 (1943).—7 references, 2 tables. See "Central . . . ," *Ceram. Abs.*, **21** [1] 2 (1942).

Mirror making—art or industry. K. P. GLADNEY. *Glass Ind.*, **24** [8] 336–37, 352 (1943).—Mirror making has not yet outgrown the stage of individual art, no matter how large the production. A new field for research has been opened by the introduction of new reducing agents and spray-coating methods. Experiments with the spray method indicate that the speed of the reaction between the silvering and reducing solutions is not proportional to the speed of mirror formation. The capacity of the glass surface to accumulate in a given time sufficient mirror silver to form a dense coat depends upon interfacial tension, diffusion speed of the reagents, and adsorption power. Reaction speed in the liquid phase depends on concentration, alkalinity, ionization phenomena, viscosity, temperature, impurities, and the number and individual rates of intermediate and auxiliary reactions. Hydrazine compounds combine speed of reaction with speed of mirror formation. To indicate means to influence mirror formation intelligently is now up to the scientists. A.P.

PATENTS

Glazed pottery. J. M. STANGL (Fulper Pottery Co.). U. S. 2,327,076, Aug. 17, 1943 (Dec. 27, 1940).—Pottery ware comprising a base formed of ceramic material containing pyrophyllite, the base being covered by a tin oxide-containing glaze which is semiopaque due to the presence of a limited precipitate of a product formed by reaction between the base and glaze during the firing operation.

Gold decorations. DEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT VORM. ROESSLER. Belg. 437,596, Feb., 1940.—Ceramic objects are covered with a silvering compound and a colorless luster and then fired. M.Ho.

Plate design. MARCELLINE GOUGLER (Castleton China, Inc.). U. S. 136,255, Aug. 31, 1943 (July 7, 1943).

Cements

PATENTS

Lime kiln. H. T. LHOEST. Belg. 434,834, July 8, 1939.—The furnace consists of a number of chambers arranged in a circle. Each is arranged for proper burning of the limestone. All of the chambers are heated by a central shaft. M.Ho.

Simultaneous production of alumina and of a product to be processed into a hydraulic cement. J. C. SÉAILLES. Belg. 437,906, March, 1940.—A mixture of a calcareous material, a ferruginous material, and an aluminosilicate or an aluminous material is given a reducing firing. The resulting clinker is leached to yield a calcium-aluminate leachate, and the residue is utilized in the manufacture of cement. M.Ho.

Treating coarse materials used in cement manufacture. F. L. SMIDTH & CO., AKTIESELSKAB. Belg. 434,890, July 8, 1939.—The whole mix is ground. Part of the ground material is further ground until it forms a slime of which the maximum particle size is approximately 15 to 20 microns. M.Ho.

Enamel

Enamel Division Standards Committee report. R. L. COOK, *Chairman*. *Bull. Amer. Ceram. Soc.*, **22** [9] 315 (1943).

PATENTS

Enamel cooking utensil. R. S. COBB AND W. B. MOORE (Moore Enameling & Mfg. Co.). Can. 413,701, July 6, 1943 (May 5, 1942). G.M.H.

Enameling composition, etc., and method of making. L. J. FROST AND C. H. COMMONS, JR. (Titanium Alloy Mfg. Co.). U. S. 2,326,348, Aug. 10, 1943 (Aug. 31, 1939).—A composition capable, upon smelting, of forming a relatively translucent frit, in turn capable of producing highly opaque enamels, etc., comprising a mixture of compounds containing approximately the following content by analysis: sodium 11, calcium 6, boron 5, aluminum 8, silicon 13, zirconium 7, zinc 4, oxygen 37, and fluorine 9%.

Improving the opacity and color of powdered enamels. AUERGES. A.-G. Belg. 436,353, Oct. 31, 1939.—The improved enamels have an enriched content of Al_2O_3, MgO, and ZnO. Their content of SiO_2, B_2O_3, and alkalis is lowered as much as their intended use will permit. CaO and BaO are lowered. M.Ho.

Obtaining dull white enamels. DEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT VORM. ROESSLER. Belg. 434,586, June 30, 1939.—At least two components which gasify at different temperatures are added to the mix. Components whose gasification points are staggered between 80° and 600° are preferred. M.Ho.

Producing pure metal oxides and dioxides for use in enamels. F. JEAN. Belg. 437,895, March, 1940.—The oxides and dioxides are produced by the action of H_2SO_4 on solutions of $SnCl_2$ and $PbCl_2$ in such manner that in the reaction mixture the metal oxides and sulfuryl chloride (SO_2Cl_2) are produced. The latter is decomposed by HCl and H_2SO_4. M.Ho.

Glass

Air conditioning aids in artillery optical equipment manufacture. ANON. *Heating & Ventilating*, **40** [8] 46 (1943).—The binocular-assembly room of the Bausch & Lomb Optical Co. plant at Rochester, N. Y., is now air conditioned. Dust and temperature control is imperative in rooms used for assembling optical parts of binoculars and microscopes and for polishing lenses. Dust will contaminate the Canada balsam used to cement lenses. Dust is also detrimental to other optical instruments. Temperature control reduces humidity and thus prevents corrosion. It also prevents changes in the wax used in lens polishing. M.R.

Beryllium in glass: I and II. K.-H. SUN. *Glass Ind.*, **24** [4] 155–56, 172; [5] 217–20, 222 (1943).—The chemistry of glass containing beryllium is reviewed theoretically, and the utilization of beryllium in silicate, borate, phosphate, and fluoride glasses is discussed. A.P.

Calculation of density. ANON. *Glass Ind.*, **24** [7] 298, 310 (1943).—The density calculations outlined by Huggins and Sun (*Jour. Amer. Ceram. Soc.*, **26** [1] 4–11 (1943)) are reproduced in condensed and illustrated form. A.P.

Clearing house in war. ANON. *Amer. Glass Rev.*, **62** [40] 28, 52 (1943).—Alexander Silverman is interviewed for further explanations of his proposal of a glass foundation (see *Bull. Amer. Ceram. Soc.*, **22** [8] 299–300 (1943)). Were a glass foundation in existence today, it could serve as a clearing house in the war emergency. A.P.

Conservation of critical materials by use of glass block units. T. W. REYNOLDS. *Heating & Ventilating*, **40** [8] 45–46 (1943).—The use of glass blocks results in a saving of much critical metal used for window sash and in paint materials used in maintaining window sash. Shades, Venetian blinds, etc., are not needed. Glass blocks reduce heat loss and thereby save fuel. They also help to keep down high relative humidity in certain industrial fields and thus retard the deterioration of building materials. M.R.

Corning's new optical plant. ANON. *Architectural Forum*, **79** [1] 87–90 (1943); *Glass Ind.*, **24** [4] 162–63 (1943).—The Corning Glass Works optical glass factory was one of the last contributions to the war effort to be constructed of steel. This industrial building is designed around its process. Raw materials preheated up to 600°F. are then melted in furnaces two stories high. After a controlled cooling, the glass is chipped and placed in small rectangular containers to be remelted. The second annealing through a series of kilns produces the glass ready for grinding and rough polishing prior to shipping. Large ventilators are used in the monitors over the furnaces, and the workmen are protected from furnace heat by a screen of air which emerges from a duct in the floor at a suitable point between them and the furnace. A dust-control system maintains the highest health standards. Illustrated with plan, cross-section, and photographs. See *Ceram. Abs.*, **21** [5] 100 (1942). M.E.P. & A.P.

Cutting wide-bore glass tubing and glass bottles. J. E. STILL. *Chem. & Ind.*, **62** [29] 271 (1943).—Another method of cutting wide-bore glass tubing and glass bottles, as contrasted to Taylor's technique (*Ceram. Abs.*, **22** [9] 151 (1943)), is characterized by electrically heating a length of wire. A piece of 28-gauge Nichrome or similar wire, 18 in. to 4 ft. long according to the size of the article to be cut, is attached at its ends to two terminals an inch or two apart on the glass-blowing bench. The wire sold as a replacement heating element for electric fires of the 750- or 1000-watt sizes is quite suitable. The terminals are supplied through a suitably placed switch with 20 to 30 volts a.c. from a transformer or with d.c. from a large battery or from a.-c. or d.-c. mains using a resistance in series. The current should be sufficient to bring the wire to a bright red heat (5 to 7 amp.), but not to make it stick to the glass. The glass tubing, bottle, or cylinder, marked at the required point with a file scratch $\frac{1}{4}$ to $\frac{1}{2}$ in. long, is held in the loop of wire so that the wire touches about half the circumference and lies along the line of the desired crack; the current is then switched on. Soft glass

tubing cracks half-way around in a few seconds; Pyrex brand tubing, combustion tubing, or thin-walled bottles require the application of a few drops of cold water to start the crack. To complete the crack, the tubing can be simply rotated in the loop of wire, care being taken to keep it in the correct plane; with large articles the current can be switched off while the wire is replaced on the other half of the circumference and then switched on again. If care is taken, the wire can be used many times. R.H.B.

Distribution of metallic atoms in two-component glasses. J. S. LUKESH. *Proc. Nat. Acad. Sci.*, **28** [7] 277–81 (1942).—Radial distribution curves for soda-silica glass and silica glass as obtained by Warren and Biscoe (*Jour. Amer. Ceram. Soc.*, **21** [2] 49–54; [7] 259–65 (1938)) were re-examined. The peaks due to the sodium-oxygen separation are not clearly resolved in the curve for the soda-silica glass. L. obtains a differential curve by subtracting the silica glass curve from the soda-silica glass curve. The resulting curve shows clearly the various peaks due to the alkali-oxygen separation. Sources of error in this differential method are discussed. The method is applied to potassium borate glasses. See "New Fourier . . .," this issue. S.Z.

Effect of arsenic on the melting and refining rate in a tank furnace of soda-lime-silica glass for colorless containers. FRANCIS WINKS. *Jour. Soc. Glass Tech.*, **27** [119] 18–21T (1943).—A large-scale test showed, under the conditions of operation described, that when the arsenic added in normal amount for decolorizing purposes was omitted from the batch, there were no noticeable changes in the rate of melting and refining or in the carefully measured amounts of fuel gas consumed by the furnace. R.H.B.

Effect of shape on the thermal endurance of glass rods. J. B. MURGATROYD. *Jour. Soc. Glass Tech.*, **27** [119] 5–17T (1943).—An examination of published experimental work on the thermal endurance of glass rods makes it possible to deduce a general relationship between thermal endurance and radius of the form: $\theta = \frac{T(1-\mu)}{\alpha E} \cdot \frac{1}{A_0 f(r)}$ in which A_0 is a constant depending only on the glass, and $f(r)$ is a function only of the radius. The expression is derived from the results of tests on borosilicate and soda-lime-silica glasses and on others of coefficient of thermal expansion intermediate between these. A table shows the relative maximum stresses developed in rods of different radii subjected to the same thermal shock. R.H.B.

Electrical breakdown of glasses at elevated temperatures. M. PIRANI. *Jour. Soc. Glass Tech.*, **27** [119] 38–41T (1943).—A method of determining the electrical breakdown temperature for glasses is described. The glass to be tested is used in the form of a bead which, after the attachment of the electrodes, is heated at a controlled rate while a current of 700 to 1000 volts is applied to it. The temperature of breakdown is characteristic for each individual glass composition and varies between 250° and 950° for different glasses. R.H.B.

Eyes of fighting forces. F. L. STEVENS. *Amer. Glass Rev.*, **62** [40] 70–71 (1943).—S. describes contributions of Britain's optical-glass industry. See "British . . .," *Ceram. Abs.*, **22** [5] 69 (1943). A.P.

Foam glass—new ceramic product. W. A. WEYL. *Mineral Inds.* (Penna. State Coll.), **12** [3] 2, 8 (Dec., 1942); reprinted in *Ceram. Age*, **41** [1] 18–19 (1943).—W. describes the properties of foam or multicellular glass and outlines the four basic methods used in its production. See *Ceram. Abs.*, **22** [1] 6 (1943); "Bubble . . .," *ibid.*, [2] 29. F.G.H.

Foreign owned glass patents available for free licensing. ANON. *Glass Ind.*, **24** [5] 211–15, 222 (1943).—Additional patents seized by the Alien Property Custodian are reviewed. See "Enemy- . . .," *Ceram. Abs.*, **22** [8] 134 (1943). A.P.

Future of glass. ANON. *Glass Ind.*, **24** [8] 335 (1943).—A plea is made for a coordinated effort on the part of all glass manufacturers through an over-all federated trade association to assure the proper place for glass in the country's industrial organization. The first problem should involve the glass industry's relationships with its people, its customers, and its government. A.P.

Glass containers simplified to save scarce materials. ANON. *Food Industries*, **14** [4] 44–46 (1942).—The scarcity of tin brings a need for glass containers. The Glass Container Assn. has designed a line of simplified glass jars. An estimate of the 1942 glass-container production and diagrams and dimensions of the proposed "Economy Jars" are given. Other glass and pottery containers are discussed. See "Simplification . . .," *Ceram. Abs.*, **21** [5] 101 (1942). M.R.

Glass containers standardized. ANON. *Food Industries*, **14** [11] 64–65 (1942).—WPB has designated 28 types and sizes of food bottles, jars, and jugs as standard containers. Each container is illustrated with dimensions. M.R.

Glass-covered immersion heater. J. H. BURROWS AND M. REISS. *Chem. & Ind.*, **62** [23] 215 (1943); *Chem. Industries*, **53** [1] 96 (1943).—Construction details are given for a practical immersion heating device. An ordinary 1-kw. bar type fire element is supported centrally in a Hysil glass tube about 50 cm. long and 35 mm. outside diameter by means of mica spacers attached to each end of the element by the terminal nuts which are usual on this type of heater bar. An electrically heated distillation apparatus for glass-distilled water is also described. R.H.B. & E.D.M.

Glass fiber column packing. JAMES M. CROWE. *Chem. Industries*, **52** [6] 745 (1943).—A definite speed-up in the rate of distillation of the rectifying columns used by the beverage-distilling industry to produce 190-proof alcohol has been made possible by the development of a new glass-fiber packing material for the columns by the Owens-Corning Fiberglas Corp.; this material greatly increases the area presented for the condensation of water and other liquids. E.D.M.

Glass fibers coating wings improve high-speed planes. ANON. *Science News Letter*, **44** [2] 23 (1943).—A nap of fine $^1/_8$-in. glass fibers reduces skin friction which is believed to be the result of turbulence between the outer layer of airfoil surface and the air beyond. G.A.K.

Glass-insulated flexible heating element. ANON. *Rev. Sci. Instruments*, **14** [1] 26 (1943).—The heating element has its resistance wire wound on a fiber-glass core, and the wire is protected by a fiber-glass braided covering. This type of fabrication is known as the Glasholm construction. The heating elements are made by the Clarostat Mfg. Co., Brooklyn, N. Y. R.H.B.

Glass for precision gauging. H. B. HAMBLETON. *Ceram. Age*, **41** [2] 38–40 (1943); *Mech. Eng.*, **65** [4] 274–76; [6] 435–37 (1943).—The following important considerations in the grinding and finishing of glass gauges are discussed: (1) grit, (2) bond, and (3) surface speed. Illustrated. See *Ceram. Abs.*, **22** [6] 104 (1943). F.G.H.

Glass at war. J. R. HAINER, JR. *Amer. Glass Rev.*, **62** [40] 17 (1943).—Glass is indispensable in wartime, but only a minute portion of the glass industry's contribution can now be told. Most of the achievements in fitting glass for war roles have come from the research laboratories. First demands were for substitutes for scarce materials, but the replacement became a superior necessity. Fiber, foam, optical, flat, container, and tubing glass are all playing important parts. Special assignments in various branches of the service for each of these types of glass are described. A.P.

Glassware industry versatility proved. E. J. DETGEN. *Domestic Commerce*, July, 1943; reprinted in *Glass Ind.*, **24** [7] 295–96, 311 (1943). A.P.

Glassworking equipment for tube production specialized in by Eisler Engineering since 1919. ANON. *Amer. Glass Rev.*, **62** [40] 32 (1943).—The Eisler Engineering Co. has designed improved glassworking machines to keep pace with the postwar plans for electronic tubes. A.P.

Government tumbler orders to Libbey Glass Co. aggregate several hundred thousand dozen. ANON. *Amer. Glass Rev.*, **62** [40] 56–57 (1943).—In addition to table

glassware, the Libbey Glass Co. is producing a variety of special wartime products. A.P.

Hayward optical glass plant largest of its kind on the Pacific coast. R. E. SWAIN. *Glass Ind.*, **24** [6] 258–59, 274 (1943).—At Maywood City, Calif., the Hayward Optical Glass Co. is producing six pots of optical glass a week and molding and fine annealing 50,000 lens blanks a month. A.P.

Heat permeability of glass panes. A. HÜBLER. *Sprechsaal*, **75**, 37–38 (1942); abstracted in *Chem. Zentr.*, **1942, II** [13] 1505.—The heat permeability of panes made of Thermolux and window glass and a simple measuring device are discussed. The latter comprises a hot plate and a thermometer between which the pane of glass to be measured is placed. M.V.C.

Mathematics of turbid media. S. Q. DUNTLEY. *Jour. Optical Soc. Amer.*, **33** [5] 252–57 (1943).—D. reviews the mathematical aspects of turbid media, such as opal glass. A.P.

Measurement of transmission and contrast in optical instruments. D. B. MCRAE. *Jour. Optical Soc. Amer.*, **33** [4] 229–43 (1943).—New methods for producing low-reflectance surfaces on glass and wartime demands for instruments with many air-glass surfaces have emphasized the need for methods of accurately measuring the light transmitted by various instruments. McR. discusses the methods used for different classes of optical instruments. A.P.

Melting performance of tank furnaces. ANON. *Glass Ind.*, **24** [7] 291–92, 312 (1943).—In place of the awkward and illogical expression, "melting on so many square feet," which has been abandoned everywhere but in the U. S., the unit "tons per 24 hr. per 100 sq. ft." is advocated. A.P.

Method and apparatus for producing samples of high melting point glass. M. PIRANI. *Jour. Soc. Glass Tech.*, **27** [119] 32–37T (1943).—A new method of making high melting point glasses without using a crucible or furnace consists in feeding a rod of sintered batch onto a rotating mandrel and heating the rod at one point by a flame until the glass begins to flow. By gradual upward movement of the heated area a stalagmite of glass grows on the mandrel. The apparatus is described. 5 figures. R.H.B.

Method of viscosity measurement in the region of 10^8 poises. S. M. COX. *Jour. Sci. Instruments*, **20** [7] 113–14 (1943).—A simple method of measuring the viscosity by spherical imprint is described, particularly in connection with the viscosities of glasses in their softening range. The formula, giving the viscosity in terms of the radius of imprint (a), the compressive force (P), the time (T), and the radius of the sphere (R), is shown by analogy with an elastic counterpart to take the form $\eta = 9PRT/16a^3$. G.A.K.

Mirror murals by Pittsburgh Plate. ANON. *Bull. Amer. Ceram. Soc.*, **22** [9] 323 (1943).

New Fourier series technique for crystal structure determination. M. J. BUERGER. *Proc. Nat. Acad. Sci.*, **28** [7] 281–85 (1942).—The differential technique of Lukesh (see "Distribution . . .," this issue) is discussed in its application to two crystals of related structure. Structural differences or omissions can be detected in this way. The technique can be applied to the determination of the type of solid solution. S.Z.

New type glass. JAMES M. CROWE. *Chem. Industries*, **52** [6] 745 (1943).—A new type of optical glass which uses no sand has been developed by the American Optical Co. Two glasses of the same type but having different properties have been discovered; one consists of boric oxide, zinc oxide, and aluminum hydroxide or beryllium oxide, and in the second cadmium oxide is substituted for zinc oxide. This is the first time that cadmium has been used as a major constituent of glass. These glasses have a higher index of refraction and a lower dispersion than normal glass. Other properties are low melting point, freedom from color, and stability to weathering and corrosion. E.D.M.

Nitrates in glass batches. S. R. SCHOLES. *Glass Ind.*, **24** [6] 256, 262 (1943).—The generic name "niter" includes both sodium and potassium nitrates. Soda niter or Chile saltpeter is very soluble and deliquescent. Potassium nitrate is less deliquescent, more expensive, and melts and decomposes at slightly higher temperatures. Niter may be called a "kindler" of the melting process, because it melts at such a low temperature (586°F.) and decomposes soon after with voluminous evolution of gases. A ton of batch requires 1.27 lb. of oxygen, representing the oxygen liberated from less than 5 lb. of soda niter, but because so much oxygen does no useful work, 25 lb. of niter per ton is desirable. Niter's oxidizing effect is transitory and its value in tank melting is questionable, but it is valuable in covered pots. A.P.

Noncritical materials basis of Hartford-Empire's new glass package. ANON. *Glass Ind.*, **24** [7] 293–94 (1943).—A new side seal glass closure announced by the Hartford-Empire Co. permits the use of noncritical gasket materials which fit snugly in spite of nonrubbery characteristics. The caps can be produced by any pressing machine at a cost similar to that for metal caps for 60 mm. and larger sizes. Side-seal finish is designed to be easily applied on approved standard neck diameters. New testing techniques evaluate gasket materials by other than the usual test specifications for rubber. Gaskets and caps may be applied by hand or automatically. When pried off, neither caps nor gaskets are injured and can be resealed. A.P.

Ophthalmic lens testing instrument. K. N. OGLE AND A. AMES, JR. *Jour. Optical Soc. Amer.*, **33** [3] 137–42 (1943).—An instrument for measuring the optical properties of a lens, which has greater flexibility than previous instruments, is described. See *Ceram. Abs.*, **20** [4] 98 (1941). A.P.

Owens-Illinois devoting much time to war-winning products. ANON. *Amer. Glass Rev.*, **62** [40] 50, 61 (1943). A.P.

Pictorial review of glass at war. *Amer. Glass Rev.*, **62** [40] 37–43 (1943).—Photographs illustrate (1) the manufacture of laminated safety glass for military aircraft, (2) fiber-glass wool, (3) milk-bottle decoration, carrying war messages to homes, (4) foam-glass masonry, (5) the carving of Multiform insulators, (6) a Carrara glass shower tub, (7) airplane windshields tested against bird impacts, (8) double-glazed window sash, (9) noncritical closures, (10) interlocking glass-block and wood-strip partitions, (11) Fiberglas cable hangers, (12) bullet-resistant glass, and (13) Carrara plate wall panels. A.P.

Pittsburgh Plate products taking prominent part in war and home drama. ANON. *Amer. Glass Rev.*, **62** [40] 58–61 (1943).—Special products of the Pittsburgh Plate Glass Co. developed for war needs are described, and the making of curved safety glass is explained in detail. Eight photographs. A.P.

Puerto Rico to have modern container plant. ANON. *Glass Ind.*, **24** [8] 338 (1943).—The Puerto Rico Glass Corp. glass container manufacturing plant near Catano will consist of two oil-fired 50-ton tank furnaces, each provided with three Hartford-Empire feeders, three Lynch Model "10" forming machines, and three Simplex lehrs. A.P.

Research group reveals results of tests made on better-known brands of table glassware. ANON. *Amer. Glass Rev.*, **62** [41] 7, 19 (1943).—Consumer's Research has published the results of its survey on table glassware, judging the pieces for appearance (clarity and brilliance), weight, capacity, and resistance to thermal shock, boiling, and impact. A brass ball was rolled against the rim of the glass under standard conditions, the severity of the blows being increased until failure occurred. Glasses of about twelve manufacturers were tested. No sample showed failures in the boiling test, nor did any show evidence of corrosion, scumming, chipping, or cracking. A.P.

Simultaneous annealing of thick- and thin-walled glass objects in a special annealing furnace. F. H. ZSCHACKE. *Glashütte*, **72**, 49–52 (1942); abstracted in *Chem. Zentr.*, **1942, II** [13] 1504–1505.—It is possible to cool thick- and thin-walled ware simultaneously in a "belt" annealing furnace, provided the highest temperatures attained in

the annealing furnace are adjusted in such a way that the thin-walled ware will not lose its shape and the rate of cooling is so regulated that even the ware with the thickest walls leaves the furnace perfectly annealed. This also applies to flashed glassware if the base glass has the same composition as the other kinds of nonflashed glassware cooled at the same time. In the "belt" annealing furnace, glasses of very different chemical composition can be annealed simultaneously, provided their softening and annealing temperatures are approximately the same. M.V.C.

Testing the impact strength of glassware. K. H. BORCHARD. *Glashütte*, **72**, 125–27 (1942); abstracted in *Chem. Zentr.*, **1942, II** [14] 1618.—Graduated tests for determining the impact strength by means of a pendulum hammer are discussed. The tests commence with a force of 5 kgm. per cm.^{2} and increase by degrees of 5 kgm. per cm.^{2} until the test piece breaks. This value is the so-called graduated impact strength. To compare the different measurements it is necessary to consider the temperature of the tests, the number of tests, errors, etc. M.V.C.

Today's designs on paper promise functional, attractive plate-glass exteriors for tomorrow. ANON. *Amer. Glass Rev.*, **62** [41] 9–10, 19 (1943).—A competition on store-front designs sponsored by *New Pencil Points*, an architectural magazine, has disclosed a trend toward a greater use of plate glass. A.P.

Use of glass in making apparatus. HANS KELLER. *Glashütte*, **72**, 149–52 (1942); abstracted in *Chem. Zentr.*, **1942, II** [13] 1505.—New uses of glass in technical apparatus and for storing stock are given. M.V.C.

Wartime packaging of glass electronic tubes. K. P. MOOREHEAD. *Glass Ind.*, **24** [6] 260, 275 (1943).—Glass electronic tubes are of varied shapes and sizes, and some have delicate projections and are extremely fragile. Tung-Sol Lamp Works has designed new packages which protect the tubes during manufacturing, testing, delivery, and storage. One carton is adaptable to five shapes of tubes. Acorn tubes are tested, "toted," and packed fifty to a one-piece tray. Individual unit cartons shipped 200 to a case are packed in four "bureau drawers." A.P.

Waxing glass filaments makes firmer thread. ANON. *Science News Letter*, **44** [5] 77 (1943).—Glass threads and glass fabrics can be made firmer, smoother, and less likely to fray and ravel by coating each filament, as it is drawn out, with wax and spinning the filaments together into thread before the wax hardens. If desired, the wax can be eliminated after processing to leave the final fabric fireproof and chemical proof. G.A.K.

Welding glass. ANON. *Mill & Factory*, **33** [1] 152 (July, 1943).—To provide better visibility for bronze and aluminum welding, a blue glass is used instead of green glass in welding where sodium yellow glare is present. It is manufactured by Willson Products, Inc., Reading, Pa. A.G.B.

Zinc oxide in glass: I–III. N. J. KREIDL. *Glass Ind.*, **24** [2] 59–62, 84–85, 87; [3] 112–15, 128; [4] 158–61, 187 (1943).—Zinc oxide imparts to glasses many specific properties which are often unique. K. discusses the following typical applications of ZnO: (1) apparatus glass; (2) thermal glasses (thermometer, water gauge, Thermos bottle); (3) compound glass; (4) stabilized phosphate glasses, ultraviolet-transmitting glasses; (5) zinc crown; (6) barium crown and flint; (7) zinc borate glass; (8) minor additions to tank glass; (9) lead substitution; (10) sulfide and selenium glasses; (11) other colored glasses; (12) fluorine opal glass; (13) glazes and enamels opacified with TiO_2; (14) crystalline glazes, devitrification; (15) electrical properties; (16) foam glass. Under 1 K. discusses representative compositions and the effects of ZnO on viscosity, chemical resistivity, heat-shock resistance, and mechanical and thermal properties. The unusual effects of zinc oxide are attributed to the ability of the zinc ion to substitute for Si^{4+} in the glass-forming network. Eight lines of evidence favor this hypothesis, and experiments with manganese as a fluorescence indicator are tabulated to confirm the conclusion. Magnesium is slightly related to zinc in this behavior, and the ferric ion is closely analogous. Under 8 it is pointed out that only 1% of zinc oxide added to Fourcault tank glass contributed a remarkable decrease in devitrification temperature and improved chemical durability and workability. Zinc oxide is undesirable in carbon amber glasses but highly desirable for high-quality crystal glasses because it forms colorless zinc sulfide. Recent work indicates that zinc-containing ceramic ware offers no health hazard. A.P.

PATENTS

Agglomerated fibrous products. ALGEMEENE KUNSTVEZEL MIJ. N. V. Belg. 435,039, Aug. 31, 1939.—Using a gaseous vehicle, a binder is introduced into a sheet made of glass fibers. This is accomplished by passing the gas carrying the binder through the layer of glass fibers so that the binder is retained by the fibers. M.Ho.

Apparatus for feeding glass into a rolling mill. PILKINGTON BROS., LTD. Belg. 435,890, Sept. 30, 1939.—In front of the orifice through which the molten glass leaves the basin a nozzle is mounted so that it can be made to revolve around an axis near its attachment. The flow of molten glass is interrupted by raising the end of the nozzle above the level of the orifice. M.Ho.

Apparatus for making glassware. H. R. SCHUTZ (Libbey Glass Co.). U. S. 2,327,825, Aug. 24, 1943 (March 29, 1940).

Apparatus for polishing sheet glass. PILKINGTON BROS., LTD. Belg. 437,471, Jan., 1940.—The apparatus consists of pairs of cylinders. At least one cylinder of each pair is made up of two pieces which squeeze the sheet from both sides of its longitudinal plane. Each of these pieces operates individually. M.Ho.

Apparatus and procedure for improving the surface of drawn glass. UNION DES VERRERIES MÉCANIQUES BELGES (SOC. ANON.). Belg. 436,092, Sept. 30, 1939.—To the water-cooled boucklers which solidify the glass leaving the bath, screens are attached for the purpose of breaking the vertical currents of air in the neighborhood of the sheets (of glass). These screens can also be arranged independently of the boucklers. M.Ho.

Arrangement for rapid annealing of glass sheets, especially thin glass sheets. A. QUENTIN. Belg. 434,208, June 30, 1939.—The cooling units are mounted on a plate to which is imparted a translational (upward) and rotational motion. They are arranged on both sides of the glass sheet and are interconnected and synchronized. M.Ho.

Automatic machine for the manufacture of bottles, etc. SOC. ANON. D'ÉTUDES ET DE CONSTRUCTIONS D'APPAREILS MÉCANIQUES POUR LA VERRERIE. Belg. 434,563, June 30, 1939. M.Ho.

Blanket feeder for glass-drawing tanks. H. L. HALBACH, W. G. KOUPAL, AND WILLIAM OWEN (Pittsburgh Plate Glass Co.). U. S. 2,327,887, Aug. 24, 1943 (Feb. 14, 1940).

Continuous glass strip polishing apparatus. F. B. WALDRON AND J. H. GRIFFIN (Pilkington Bros., Ltd.). Can. 413,712, July 6, 1943 (Oct. 21, 1941). G.M.H.

Cutting blowpipe for glassmaking. SOC. ANON. ÉTABLISSEMENTS BIEBUYCK. Belg. 435,057, July 8, 1939.—The burners of the blowpipe are formed by radial channels. Their cross section diminishes from the periphery toward the center. M.Ho.

Depositing a metallic layer on an insulating substance, especially on glass. C. LORENZ A.-G. Belg. 434,863, July 8, 1939.—The metal to be deposited is finely subdivided and mixed with a glass melting at a low temperature. M.Ho.

Double panes. PILKINGTON BROS., LTD. Belg. 436,081, Sept. 30, 1939.—Two sheets of glass are separated by a marginal spacer containing a desiccating substance. M.Ho.

Double windowpanes. PILKINGTON BROS., LTD. Belg. 436,080, Sept. 30, 1939.—The spacer separating the two panes is provided with an aperture. Through it dry air or a dry gas is admitted into the space between the two panes, and the aperture is sealed. M.Ho.

Dressing plate glass. GLACERIES DE LA SAMBRE SOC. ANON. Belg. 437,657, Feb., 1940.—The glass to be dressed is placed on a unit having multiple elements, such as rolls, small balls, or disks, arranged on shafts. This unit serves to convey the glass. M.HO.

Fibers of colored glass and their manufacture. ALGEMEENE KUNSTVEZEL MIJ. N. V. Belg. 436,924, Jan., 1940.—The fibers are produced from a batch into which is incorporated a compound of a readily reducible metal (of the Cu or Pb groups). The fibers are reheated in a reducing atmosphere. M.HO.

Furnace for fusing and fining hard fusible materials such as glass. ALGEMEENE KUNSTVEZEL MIJ. N. V. Belg. 436,055, Dec. 30, 1939.—The furnace is electric. A preheated mass follows a sinuous path within the interior of the furnace. An alternating current is passed through the charge in such a manner that it is heated by induction. The molten refined product is drained continually from the furnace. M.HO.

Glass article and method of manufacturing. VICTOR WALKER (Aln Cin, Inc.). U. S. 2,328,533, Aug. 31, 1943 (Dec. 26, 1941).—An apparatus for processing curved surfaces.

Glass-chilling process. J. B. MITFORD AND W. W. SHAVER (Pilkington Bros., Ltd.). Can. 413,849, July 13, 1943 (Feb. 27, 1941). G.M.H.

Glass flowmeter. V. E. HOFFMAN AND E. F. KELM (Corning Glass Works). Can. 413,673, July 6, 1943 (Dec. 26, 1940; in U. S. Jan. 6, 1940). G.M.H.

Glass lehrs. BRITISH THOMSON-HOUSTON CO., LTD. Brit. 554,899, Aug. 5, 1943 (Feb. 10, 1941).

Glass tempering. GERALD WHITE (Libbey-Owens-Ford Glass Co.). U. S. 2,328,404, Aug. 31, 1943 (April 28, 1941).

Glass thread. SOC. ANON. VETRERIA ITALIANA BALZARETTI MODIGLIANI. Belg. 436,581, Nov. 30, 1939; addition to Belg. 433,349, April 29, 1939.—The glass thread is made of tubes of cross-wound glass filaments. The furnace and the spinnerette are arranged axially. The crisscrossing of the filaments is achieved automatically due to the fact that each helical winding of the filament deposited from each orifice of the spinnerette has a larger diameter than the winding preceding it. M.HO.

Glass tube tipping-off apparatus. W. J. GEIGER AND R. J. AYRES (Canadian General Electric Co., Ltd.). Can. 413,493, June 29, 1943 (Aug. 14, 1941). G.M.H.

Heat-rejecting glass. R. A. MILLER (Pittsburgh Plate Glass Co.). U. S. 2,327,918, Aug. 24, 1943 (Jan. 23, 1941).—A heat-rejecting glazing unit comprising a panel formed of a glass plate, horizontal bands of reflecting material arranged on one surface of the glass plate in spaced relation, a second plate of glass covering the banded surface of the first glass plate, a third plate of glass having horizontal bands of reflecting material arranged on one surface thereof in spaced relation, the third plate covering the unbanded surface of the first glass plate, the horizontal bands of each plate being laterally in register, and interposed layers of plastic material uniting the glass plates.

Heat and sound insulation made of glass. COMPAGNIE DES VERRERIES DE MOUTIER POUR LA FABRICATION MÉCANIQUE DU VERRE. Belg. 437,801, Feb., 1940.—Glass grains are placed between two sheets of glass and the whole is welded together. This welding can be accomplished by softening the glass. Both the sheets and the grains can be made of a plastic. M.HO.

Improved electrodes for heating glassmelting baths. SOC. ANON. DES MANUFACTURES DES GLACES & PRODUITS CHIMIQUES DE ST.-GOBAIN, CHAUNY & CIREY. Belg. 435,587, Aug. 31, 1939.—The electrode is made of a more or less porous material. It is provided with a cavity in its center within which is maintained a predetermined pressure to influence the reactions occurring on its surface. M.HO.

Improved method for the production of silica products. N. S. GARBISCH. Belg. 436,308, Oct. 31, 1939.—Silica and finely ground glass are mixed with a soluble flux and water to form a pasty mass. This is briquetted, dried, and used for the manufacture of glass. M.HO.

Improved procedure for annealing hollow glass objects. A. QUENTIN. Belg. 437,739, Feb., 1940.—The object is heated slowly and exposed for 5 to 10 sec. to jets of air compressed at 7 to 8 atm. The air jets emanate from tubes placed at a distance of a few millimeters from the walls. The interior surfaces are annealed faster than the exterior surfaces. M.HO.

Improved procedure and apparatus for tempering glass. PILKINGTON BROS., LTD. Belg. 437,147, Jan., 1940.—The glass object is exposed for a short time to the action of a liquid having a higher temperature than that which produces crackling and the desired temper. This is followed by treatment with a liquid heated to the degree of the desired temper. M.HO.

Improved procedure for manufacturing hollow glass articles. L. GERBAUD. Belg. 435,922, Sept. 30, 1939.—The body of the article is separated from the calotte on which it was blown by a circular range of flames turning around the stationary roughly shaped article. This produces a certain stretching of the annular portion before it is cut by the flames. By this method, swelling of the cut borders is avoided. M.HO.

Improved process for drawing glass. A. QUENTIN. Belg. 437,146, Dec. 30, 1939.—The sheet glass, after being separated from the molten mass, is subjected to the action of a compressed fluid for the purpose of simultaneously reducing the thickness of the sheet and polishing its surfaces. M.HO.

Improved process of tempering hollow glass objects. PILKINGTON BROS., LTD. Belg. 436,745, Nov. 30, 1939.—The quantity of cooling gas blown into the bottle is greater than that used on its surface to assure that the two surfaces are cooled to the same degree. M.HO.

Improvement in electric fusion furnaces, especially for fusing glass. SOC. ANON. DES MANUFACTURES DES GLACES & PRODUITS CHIMIQUES DE ST.-GOBAIN, CHAUNY & CIREY. Belg. 436,401, Oct. 31, 1939.—The first hot zone encountered by the entering feed is wider than the stream of the molten mass in the zone where it is being refined. The fusion electrodes are placed in the upper part of the bath while the refining electrodes are placed in its lower part. **Belg. 436,402,** Oct. 31, 1939.—The electrodes are placed in a zone of relatively short length which forms a continuation of the zone where the material is fed into the kiln. This arrangement permits the refining to be done without the use of special electrodes in a zone immediately following the zone of fusion. M.HO.

Improvement in the manufacture of ceramic products. N. S. GARBISCH. Belg. 436,794, Nov. 30, 1939.—The glass is finely ground and then treated with a dilute mineral acid. M.HO.

Improvement in the production of fibers made of glass, etc. ALGEMEENE KUNSTVEZEL MIJ. N. V. Belg. 434,530, June 30, 1939.—The median channel of the blower, through which the glass flows to be blown into fibers, is extended by a conduit through which the gas flows after it leaves the compression chamber. In this conduit the gas and the filaments of molten glass mix. M.HO.

Improvement in the production of multicellular glass. SOC. ANON. DES MANUFACTURES DES GLACES & PRODUITS CHIMIQUES DE ST.-GOBAIN, CHAUNY & CIREY. Belg. 437,418, Jan., 1940.—The bubbles are produced by the reaction of compounds which, at the melting temperature of glass, give off a gas and at the same time liberate a product having a high vapor pressure. M.HO.

Improvements for siliceous products. N. S. GARBISCH. Belg. 436,901, Dec. 30, 1939.—The sand used for polishing glass is freed of iron. The polishing machine is made of nonferrous material. The sand is screened; it is reused until it passes through a sieve of predetermined fineness. When no longer of use for polishing, the sand can be utilized in the manufacture of high-quality glass, pottery, etc. M.HO.

Installation for tempering glass. PRODUITS VITRIFIÉS ST.-CHRISTOPHE S. A. Belg. 436,606, Nov. 30, 1939.—The tempered sheet is kept horizontal during its re-

heating and cooling and during its passage through the blower. This can be done with varimeshed screen carried on a rolling frame. M.Ho.

Luminairs. Holophane, Ltd. (Holophane Co., Inc.). Brit. 554,369, July 14, 1943 (Sept. 14, 1942).

Machine for making glass articles. C. B. Shillinger (Owens-Illinois Glass Co.). U. S. 2,327,673, Aug. 24, 1943 (July 29, 1939).

Manufacture of mirrors. Andrew Levaggi. U. S. 2,327,723, Aug. 24, 1943 (Sept. 7, 1940).—The process of silver coating glass to form a mirror which comprises coating the surface of the glass with a silver depositing solution, applying by radiation infrared rays from an electric lamp source directly against the surface of the solution for a period of about $5^1/_2$ to $7^1/_2$ min., and controlling the intensity and duration of the rays by positioning the source thereof so that continued penetration of the rays to the depth of the solution is effected during their period of application.

Manufacture of objects consisting of several units, especially hollow glassware. Soc. Anon. des Manufactures des Glaces & Produits Chimiques de St.-Gobain, Chauny & Cirey. Belg. 434,628, June 30, 1939.—The surfaces of contact are provided with ribs and grooves. Thus, when the surfaces press against each other, only the ribs and grooves are deformed, and the objects themselves are not affected. M.Ho.

Manufacture of vitrified quartz. Egyesült Izzólámpa és Villamossági Reszvenytarsasag. Belg. 437,490, Feb., 1940.—As a starting material precipitated SiO_2 is used. This is heated *in vacuo* and fused in an atmosphere of, e.g., helium. M.Ho.

Manufacturing glass tubes having a precise internal diameter. M. Samuel. Belg. 434,651, July 8, 1939.—A tube is placed on a support and then placed in a mold. The upper part of the tube is heated until it fits the mold. The support is then removed and the tube is gradually heated from top to bottom so that it fits the mold exactly. M.Ho.

Mold and method of making. J. F. Kelly and W. J. Kelly. U. S. 2,326,730, Aug. 10, 1943 (Sept. 18, 1939).—An implement for forming molten glass adapted to be used with glass-molding machinery, the implement being composed of a body of cast iron having fused thereto a glass-engaging portion composed of carbon 2.25 to 3.25, silicon 1 to 3, manganese 0.50 to 1, nickel 20 to 50%, and the remainder principally iron with impurities, the glass-engaging portion also including chromium 0.01 to 6% and molybdenum in quantities between 0.01 and 2%.

Molten glass bath. Pilkington Bros., Ltd. Belg. 436,557, Nov. 30, 1939.—The upper edge of the wall of the bath extends above the level of the molten glass. On the top of the wall rest metallic cooling boxes. The lower end of these boxes extends appreciably below the lower level of the uppermost tier of the wall. M.Ho.

Obtaining uniform surface layers free of mars on ceramic objects. Jenaer Glaswerk Schott & Gen. Belg. 437,382, Jan., 1940.—Surface layers are treated with an etching solution having a flocculating effect on the dissolved substances. This effect is greater than the dissolving power of this solution. M.Ho.

Perfected method for manufacturing glass fibers, etc. Algemeene Kunstvezel Mij. N. V. Belg. 435,106, July 8, 1939.—While the fibers are viscous they are subjected to vibration generated by sonic or ultrasonic waves. M.Ho.

Plastic composition for laminated glass interlayers. L. P. Kyrides (Monsanto Chemical Co.). U. S. 2,327,652, Aug. 24, 1943 (April 27, 1940).

Procedure and apparatus for the continuous production of tubes of glass, etc. Compagnies Réunies des Glaces et Verres Spéciaux du Nord de la France. Belg. 437,016, Dec. 30, 1939.—A gas is blown into the interior of a tube of molten glass. After the gas enters the lower part, it fans out in such a manner that it spreads throughout the interior and along the surface of the tube. M.Ho.

Procedure and apparatus for drawing sheet glass. Union des Verreries Mécaniques Belges (Soc. anon.), E. Brichard, and G. Henry. Belg. 435,389, Aug. 31, 1939.—The glass is drawn from a tank connected to the melting bath by passages which admit only the amount of molten matter necessary for drawing. The walls of this tank are made of refractory material in which passages are made to admit the molten mass. Several construction designs are described. M.Ho.

Procedure and apparatus for manufacturing mats and layers of glass fibers or fibers of similar inorganic materials. N. V. Mij. tot Beheer en Exploitatie van Octrooien. Belg. 434,348, June 30, 1939; addition to Belg. 417,715.—Between the receiver (for the fibers) and the main blower is installed an additional blower which controls the velocity and the direction of the fibers and helps to make them thin. M.Ho.

Procedure and apparatus for melting glass, etc. Union des Verreries Mécaniques Belges (Soc. Anon.), G. Henry, and E. Brichard. Belg. 434,120, June 30, 1939.—Jets of flame are injected under pressure into a crucible containing the molten mass. The crucible is located in the base of a shaft furnace. The shaft contains the mix. The hot gases pass through the mix which is cascading into the crucible. M.Ho.

Procedure and apparatus for the production of fibers made from glass, etc. Algemeene Kunstvezel Mij. N. V. Belg. 434,529, June 30, 1939.—A thread of molten matter is enveloped in a gas flowing under pressure. By its motion, the gas exerts a drawing action on the fiber. The velocity of the gas and the fiber is increased by causing them to pass through a constricted orifice. M.Ho.

Procedure and apparatus for the production of glass fibers. Algemeene Kunstvezel Mij. N. V. Belg. 437,196, Dec. 30, 1939.—The molten glass leaves the pot in fine streams. The streams are drawn out by jets of gas emanating from two series of orifices placed on either side of the flowing glass. Within each series the jets are arranged so that calm zones are formed between them. The streams of molten glass are made to flow through these zones. M.Ho.

Procedure and apparatus for the production of special glass. Union des Verreries Mécaniques Belges (Soc. Anon.). Belg. 434,473, June 30, 1939.—In the drawing chamber are found holders on which are mounted devices for the purpose of imparting the desired design to the glass. These devices come in contact with the glass while it is yet in a plastic state. To achieve a complicated design, the devices can be made to move. M.Ho.

Procedure and apparatus for tempering sheet glass. Soc. Anon. des Manufactures des Glaces & Produits Chimiques de St.-Gobain, Chauny & Cirey. Belg. 436,665, Nov. 30, 1939.—The glass sheet is supported at its lower edge and is kept in a vertical position by two mobile parallel metallic clamps which transport the sheet through the furnace and the cooling unit. M.Ho.

Procedure for manufacturing curled or waved glass fibers. Algemeene Kunstvezel Mij. N. V. Belg. 435,829, Oct. 31, 1939.—Plastic filaments are passed between profiled cylinders. Under the action of air blown between the cylinders and because of its own weight, the material leaving the cylinders drops, forming wavy or curled fibers. M.Ho.

Procedure for the production of sheets, felt, and cushions of glass wool. Vetrocoke Soc. Anon. Belg. 437,061, Dec. 30, 1939.—Glass fibers are suspended in water. The suspension is filtered on a wire gauze, and the moist product is first air-dried and then dried. M.Ho.

Production of drinking glasses having a stem. Verreries et Gobeleteries Nouvelles. Belg. 434,479, June 30, 1939.—The goblet is formed first. To it is fused a lump of glass from which the stem and the foot are shaped. M.Ho.

Quartz- or glass-to-metal seals. British Thomson-Houston Co., Ltd. Brit. 554,330, July 14, 1943 (July 29, 1941).

Treatment of glass surfaces. W. E. CAMPBELL (Pittsburgh Plate Glass Co.). U. S. 2,327,868, Aug. 24, 1943 (Aug. 28, 1941).—A process of treating a glass surface which comprises applying a film of adhesive to the glass surface and subjecting the treated surface to temperatures reduced sufficiently to cause chipping off of adhesive and glass therefrom.

Wall for buildings. RAYMOND NICHOLS AND J. A. DESMONE (Pittsburgh Corning Corp.). U. S. 2,326,245, Aug. 10, 1943 (Oct. 26, 1940).—A wall structure comprising a series of panels, each panel being composed of a plurality of glass blocks.

Structural Clay Products

Brick arches for tank walls. O. ALBERT. *Eng. News-Record*, **131** [7] 260–62 (1943).—A number of sewage-digester and clarifier tanks at eastern army camps have been built with multiple-arch brick walls. G.A.K.

Field findings on Rio Grande volcanic ash. R. L. NORDEMEYER. *Ceram. Age*, **41** [2] 41 (1943).—N. discusses the use of volcanic ash in the production of building brick and tile. F.G.H.

*** German building culture in the Baltic states.** ANON. *Tonind.-Ztg.*, **66** [27–28] 285–87 (1942).—Examples of brick, granite, and limestone building art in Riga, Reval, and other Baltic sites, built since the 13th century under German colonization and later by German settlers, are described and illustrated. M.HA.

Heavy duty clay tile drains. V. O. MCCLURG. *Eng. News-Record*, **131** [7] 263 (1943).—The installation of extra-strength clay tile, capable of supporting heavy grading equipment, provided an economic method for draining an ordnance-plant site. To obtain increased wall thickness in the clay tile, the internal dies used for their manufacture were simply machined to a smaller diameter. Comprehensive surveys of existing drainage lines reduced breakage of the old tile during grading operations. G.A.K.

Klinker brick. ANON. *Brit. Clayworker*, **51** [605] 66–67 (1942); reprinted in *Ceram. Age*, **41** [2] 48–49 (1943).—The raw materials used and the making, drying, and firing of klinker brick are briefly described. Illustrated. F.G.H.

Making multicolored brick. ANON. *Ceram. Age*, **40** [5] 140 (1942).—Fundamental practices are briefly reviewed. F.G.H.

Modular size of clay-products units. HARRY C. PLUMMER AND E. F. WANNER. *Jour. Amer. Ceram. Soc.*, **26** [9] 307–20 (1943).—4 references, 8 figures.

Modularia. FREDERICK HEATH, JR. *Bull. Amer. Ceram. Soc.*, **22** [9] 305 (1943).—1 reference.

*** Problem of decoration in modern brick construction.** DAMM. *Tonind.-Ztg.*, **66** [13–14] 143–46 (1942).—The lack of understanding in the application of the medieval (especially German) ornamental effect of brick, in regard to color, setting, and combinations with woodwork, as shown by the inartistic effects in modern buildings, is explained with examples, and methods of reviving this harmonious effect by proper design and consideration of the character of the surroundings are discussed. M.HA.

Use of electrolytes in heavy clay products manufacture. R. H. ELLIS-ANWYL. *Ceram. Age*, **40** [6] 166–68 (1942); see *Ceram. Abs.*, **22** [5] 72 (1943). F.G.H.

Wartime problems of structural clay products industry. ANON. *Bull. Amer. Ceram. Soc.*, **22** [9] 316 (1943).

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Hollow building unit for steel-reinforced walls. E. F. WANNER (National Fireproofing Corp.). U. S. 2,326,708, Aug. 10, 1943 (April 17, 1940).

Hollow floor brick which can be used with or without reinforcement. V. PIERANTONI. Belg. 435,479, Aug. 31, 1939.—Several shapes of brick are described. M.HO.

Porous ceramic mass. R. A. AMAND AND J. ROBITSCHEK. Belg. 437,113, Dec. 30, 1939.—Gas evolution is caused within a wet or dry ceramic paste by the action of microorganisms on organic matter. M.HO.

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* Obtained from microfilm.

Refractories

Causes of failure of patching and daubing mixes for foundry refractory purposes. A. R. BLACKBURN. *Amer. Foundryman*, **5** [4] 50–52 (1943).—B. discusses the service conditions which patching and daubing mixes undergo in the foundry that cause them to fail in use. The mixes usually consist of siliceous material and clay, and in some cases ground firebrick or calcined clay, organic binders, and plasticizing agents are added. The important service conditions which these refractory mixes undergo are (1) the thermochemical reaction between the alumina and silica and (2) the repeated heating and cooling of the siliceous material with subsequent expansion and contraction. In spite of their high heat-resistant properties, spalling is still the main cause of their failure. M.A.S.

Chromite and magnesite refractories. GILBERT E. SEIL. Abstracted in *Ceram. Age*, **40** [3] 76 (1942).—S. presents a brief review of recent developments in the production of chrome and magnesite refractories. F.G.H.

Conserving foundry refractories. C. E. BALES AND F. MCCARTHY. *Foundry*, **71** [5] 95, 180–82 (1943).—Recommendations for the lining and maintenance of foundry cupolas and ladles are given in detail. F.G.H.

Construction and operation of a 15-inch cupola. FULTON HOLTBY. *Foundry*, **69** [8] 66–67, 114–16 (1941).—Refractory construction and maintenance are described in detail. Illustrated. F.G.H.

Furnace refractories. E. GREGORY AND E. N. SIMONS. *Edgar Allen News*, **22** [253] 145–49 (1943).—Furnaces for heat-treating steel are discussed, and materials used in them are described. In selecting the proper materials, the following maximum safe temperatures are recommended: (*a*) superquality hot-face insulating brick, hot-face or junction temperature, 1350°; (*b*) superquality insulating concrete, hot-face or junction temperature, 1250°; (*c*) standard quality hot-face fire-clay insulating brick, hot-face or junction temperature, 1150°; and (*d*) low-temperature diatomaceous insulating brick, junction temperature, 800°. These brick should not be subjected to direct gas or flame impingement. A chart is given for estimating temperature gradients and junction temperatures for any combination of refractory and insulating materials. In selecting the jointing material, its temperature can be taken as the mean temperature of the brickwork; if above 1250°C., the appropriate fire clay can be used, but at lower temperatures high-temperature air-setting refractory cement is a much more suitable medium. It sets with rocklike hardness at atmospheric temperatures and has a refractoriness only slightly below that of the best fire clays. Air-setting cement is not recommended for sprung roofs (instead of suspended roofs) because they expand under heat and an air-setting cement would prevent the expansion. Insulating brick of all types should be jointed with a cement made from the same material as the brick, suitably bonded. In electric heat-treating furnaces, sillimanite is often considered desirable to avoid contamination of the steel by the refractory. The heating

elements should be of a material which cannot react with the brickwork, e.g., silicon carbide (Silite); this can be used for temperatures up to 1400°C. M.Ha.

Furnace walls are temperamental. GEORGE P. REINTJES. *Power*, **87** [5] 329–30 (1943).—R. discusses some of the correct and incorrect types of refractory construction in boiler furnaces. Illustrated. F.G.H.

General requirements of firebrick. LEO J. FRANZ. *Ceram. Age*, **41** [1] 11–12 (1943).—F. briefly discusses firebrick specifications. F.G.H.

High-temperature cement versus fire clay for boiler furnaces. J. M. ROBITSCHEK. *Nat. Engr.*, **47** [5] 286–90 (1943).—Joints in the brickwork of furnace walls are important. Refractory mortars (fire clays), more porous than the brick they join, are heated on only one face and therefore make a poor bond. High-temperature cements have high bonding strength and tend to form a monolithic structure with the brick upon heating. The advantages of high-temperature cements are as follows: (1) The joint is strong. (2) The interstices between refractory grains can be filled and the pores of brick can be sealed to prevent air infiltration. (3) They become "pyroplastic" at high temperatures, thereby enabling the joints to yield under stresses. (4) They resist the chemical action of slags. (5) They are mechanically indestructible. (6) Their high bonding strength holds in place even large parts of brick or shapes which may have been broken, thus preventing the formation of large cavities which are easily attacked by flame and slag. (7) Their high bonding strength and ability to yield to stresses prevent damage to walls and arches. Alumina-silicate cements containing fire-clay aggregate may be used for temperatures up to 2800°F. (resistance to slag action moderate). They are fairly good for ceramic kilns. High-alumina cement withstands temperatures up to 3300°F. (high resistance to slag attack). Their most important uses are in metallurgical kilns, lime and cement kilns, and parts of boiler settings subjected to high temperatures. Chrome-ore cements withstand temperatures up to 3600°F. (resistance to slag attack). They are unsuitable for glassmelting furnaces as they can discolor glass. Fused alumina, zirconium oxide, and fused magnesia yield cements which withstand any temperature found in industry. They are good for linings of electric melting furnaces and laboratory kilns for extremely high temperatures. M.R.

Hints on converter practice. FREDERICK G. SEFING. *Foundry*, **71** [2] 87 (1943).—S. briefly reviews refractory considerations in both acid and basic converter practice. F.G.H.

Melting quality castings in the cupola. HAROLD S. AUSTIN. *Foundry*, **69** [12] 59, 140–44 (1941).—Methods for evaluating cupola refractories are briefly described. F.G.H.

Melting quality iron in the cupola. HAROLD S. AUSTIN. *Foundry*, **69** [11] 59, 139–43 (1941).—Refractory linings for cupolas and ladles are discussed. Illustrated. F.G.H.

Observations on solid-phase inversions of calcium orthosilicate, constituent of dolomite-silica brick. SAMUEL ZERFOSS AND H. M. DAVIS. *Jour. Amer. Ceram. Soc.*, **26** [9] 302–307 (1943).—15 references.

Phosphorus furnace reactions. C. P. ZERGIEBEL AND JAMES W. LUCAS. *Trans. Electrochem. Soc.*, **81**, 97–102 (1942).—The electric-furnace process for the production of elemental phosphorus consists in smelting phosphatic material with sufficient carbon to reduce the phosphorus and iron present. Electric-furnace design and refractory construction requirements are discussed in detail. F.G.H.

Producing steel continuously in a light-castings foundry. C. H. KAIN AND L. W. SANDERS. *Foundry*, **71** [2] 82, 141–46 (1943).—The basic electric and the tropenas or side-blow converter processes for the production of light carbon-steel castings are described. Details are given covering the linings of both electric furnaces and side-blow converters. F.G.H.

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Brick for flues. KOHLE- UND EISENFORSCHUNG G.M.B.H. Belg. 437,414, Jan., 1940.—The refractory brick or at least its surface in contact with steel is impregnated with tar, creosote, bitumen, paraffin, or a similar carbonaceous liquid. M.Ho.

Concentration of kyanite. F. X. TARTARON (Minerals Separation North American Corp.). U. S. 2,326,807, Aug. 17, 1943 (Feb. 6, 1942).—A process of concentrating kyanite from its ores which comprises comminuting the ore to suitable particle size, pretreating the comminuted ore by agitating it in a pulp containing nitric acid, washing the nitric acid away from the ore, conditioning the acid-treated and washed ore by agitating it in a pulp containing as the only flotation agent an anionic reagent consisting of a higher fatty acid containing at least 12 carbon atoms, and subjecting the conditioned pulp of kyanite ore to froth flotation to separate in the froth a concentration of kyanite.

Construction of arches, etc., in metallurgical furnaces subjected to great stresses. MAGNESITAL G.M.B.H. Belg. 436,893, Dec. 30, 1939.—The parts are built of chrome ore and magnesite with a magnesia content of over 50%. M.Ho.

Construction of arches, particularly of blast furnaces. KOHLE- UND EISENFORSCHUNG G.M.B.H. Belg. 437,253, Jan., 1940.—The refractory brick of the lining are impregnated with a carbonaceous material such as tar, creosote, bitumen, or paraffin. M.Ho.

Dry process for the manufacture of refractory brick from dolomite or limestone. SOC. ANON. DES HAUTS-FOURNEAUX DE LA CHIERS. Belg. 436,821, Nov. 30, 1939.—From the time the fritted material leaves the cupola furnace until it enters the firing furnace all the operations are carried out in a predetermined manner to prevent the cooling of the material to a degree where it could be affected by the atmosphere. M.Ho.

Firebrick for use in domestic fire grates. KIMOLO MANUFACTURERS, LTD., AND G. V. PARKER. Brit. 554,677, July 28, 1943 (March 27, 1942).

Highly refractory material and its manufacture. K. J. STENVIK. Belg. 435,050, Aug. 31, 1939.—This material is composed of tricalcium silicate and a combination of CaO and oxides of trivalent metals taken in such proportions that the oxides combined with the crystals of a silicate at 1330° to 1560° form a solid solution. M.Ho.

Improved refractory tuyères, particularly for use in casting ladles. THOMAS MARSHALL & CO. (Loxley), LTD., AND A. MARSHALL, JR. Belg. 435,363, Aug. 31, 1939.—The tuyère is made of a mixture of plastic clay and graphite. It is fired in an oxidizing atmosphere, and at the same time a reducing atmosphere is maintained in the inside of the tuyère. This is attained by filling the inside with a reducing agent. M.Ho.

Improvement in refractories. P. B. SILLIMANITE CO., LTD. Belg. 437,955, March, 1940.—A thin layer of a finely subdivided refractory material is first applied which forms a nonporous coating with fritting agents and fluxes. A thicker layer of a finely subdivided refractory material is then applied which, when the whole is heated at a high temperature, transforms both layers into a porous coating. M.Ho.

Method of heat casting refractory blocks. H. T. SMYTH (Corhart Refractories Co.). U. S. 2,327,674, Aug. 24, 1943 (May 22, 1940).

Preparation of alumina. ENGLISH CLAYS, LOVERING, POCHIN, & CO., LTD., R. J. DAVIES, H. O. DERING, AND T. W. PARKER. Brit. 554,593, July 21, 1943 (Dec. 1, 1939).

Preparation of alumina from clay or other aluminum-containing materials. ENGLISH CLAYS, LOVERING, POCHIN, & CO., LTD., R. J. DAVIES, H. O. DERING, AND T. W. PARKER. Brit. 554,591 and 554,592, July 21, 1943 (Dec. 1, 1939).

Pulverized refractory cements and refractory products made therefrom. I. G. FARBENINDUSTRIE A.-G. Belg. 434,107, June 30, 1939.—The cement contains the residues of alkaline decomposition of Cr minerals. These residues are heated to red heat and then pulverized. Fluxes,

binders, and refractory matter are added to the cement if necessary. M.Ho.

Removing silicic acid from aluminosilicates (clays). I. G. FARBENINDUSTRIE A.-G. Belg. 434,645, July 8, 1939.—The aluminosilicate is mixed with carbon (1 atom of C for each atom of Si). The mixture is heated at 1200° to 1500° under decreased pressure. The C may be replaced by an equivalent amount of SiC. M.Ho.

Sagger in the form of a cell protecting ceramic products. R. A. AMAND AND J. ROBITSCHEK. Belg. 437,114, Dec. 30, 1939.—The sagger is made from a paste having an average specific heat capacity up to 0.5 cal. per dm.^{3} and an apparent density of not more than 0.25 kgm. per dm.^{3}. M.Ho.

Siliceous brick. SILIKA- UND SCHAMOTTE-FABRIKEN MARTIN & PAGENSTECHER A.-G. Belg. 434,504, June 30, 1939.—A small quantity of finely ground calcium ferrite is added to the mix. M.Ho.

Substitute for sillimanite composed of a mixture of clay and Al_2O_3. F. SINGER. Belg. 436,025, Sept. 30, 1939.—Clay is mixed with Al_2O_3 obtained by oxidizing metallic Al at about 700°. The clay-alumina mixture is calcined at 1400° to 1500°. M.Ho.

Terra Cotta

Developments in the manufacture of chemical stoneware. JOSEF H. ROBITSCHEK. *Ceram. Age*, **40** [5] 134–36, 151 (1942).—R. presents a general outline covering a few of the most important special stoneware bodies recently perfected. At present the manufacturers of chemical stoneware supply the chemical and allied industries with many different types of stoneware, and they are providing for future requirements by improving old and developing new bodies. This development, from the ordinary stoneware to bodies of high thermal conductivity, high mechanical strength, white color, and high resistance to thermal changes, becomes of particular importance at the present time, when raw materials for the manufacture of stainless steel, corrosion-proof alloys, rubber, or glass-lined steel equipment are not at free disposal for the manufacture of corrosion-proof equipment. The chief constituents of chemical stoneware, viz., good stoneware clays, are practically unlimited in supply. F.G.H.

Select floor materials to suit plant needs. R. KANEGSBERG. *Food Industries*, **14** [8] 53–55 (1942).—K. discusses floor materials suitable for factories. Ceramic tile mosaic, quarry and vitrified tile, and brick are included. Data on foundations and laying are given. M.R.

PATENT

Assembling mosaic panels. R. E. L. NOEL. Belg. 434,587, June 30, 1939. M.Ho.

Whiteware

Making dinnerware for Uncle Sam. ANON. *Ceram. Age*, **40** [6] 172–73 (1942).—Two pages of illustrations are presented. F.G.H.

Pottery manufacture in Western Australia. H. BOWLEY. *Jour. Roy. Soc. W. Australia; Clay Prod. Jour. Australia; Ceram. Age*, **40** [6] 185–86 (1942).—B. presents a brief historical résumé of the ceramic industry in Western Australia. F.G.H.

PATENTS

Ceramic electric current carriers particularly for mercury switches. BRITISH THOMSON-HOUSTON CO., LTD. Brit. 554,511, July 21, 1943 (Jan. 7, 1941).

Ceramic insulating material and process for producing. GODSHALK BERGE (Johnson Laboratories, Inc.). U. S. 2,328,410, Aug. 31, 1943 (Oct. 15, 1937).—The process of producing ceramic insulating material, including mixing powdered magnesium-beryllium titanate, titanium dioxide, and beryl in substantially the proportions of 30 to 35, 65 to 60, and 5%, respectively, finely grinding the mixture, molding the mixture under pressure with an intermixed binder, and firing the molded mixture.

High strength ceramic surface. K. E. STETTINIUS AND B. F. DEWEY (Lapp Insulator Co., Inc.). U. S. 2,327,972, Aug. 24, 1943 (Jan. 17, 1939).—A porcelain body having a portion of its surface coated with an added ceramic coating and a multiplicity of particles of ceramic material contained in the coating and held thereby to the body with portions of the particles projecting above the coating to provide a roughened surface, the coating and the particles after firing having coefficients of thermal expansion lower than that of the body.

Method and means of forming handles or ears on ceramic articles. A. I. MATTISON. Brit. 554,483, July 21, 1943 (April 9, 1942).

Spark plug. BERNARD HOPPS AND C. J. SMITHELLS (Lodge Plugs, Ltd.). Can. 413,371, June 22, 1943 (May 14, 1942). G.M.H.

Equipment and Apparatus

Activating light sources for luminescent materials. E. W. BEGGS. *Jour. Optical Soc. Amer.*, **33** [2] 61–70 (1943).—B. presents fundamental characteristics of the four types of luminescence-activating light sources: (1) incandescent filament, (2) argon glow, (3) mercury vapor, and (4) fluorescent lamps. Relative efficiencies are compared. Auxiliary equipment for each is described. Factors controlling the choice of activator for a particular application include convenience, speed of operation, power requirements, shock resistance, and efficiency. A.P.

Briquetting press and electrode loader for spectrochemical analysis. H. C. HARRISON AND C. C. RALPH. *Ind. Eng. Chem., Anal. Ed.*, **15** [7] 466–67 (1943).—An inexpensive and easily constructed apparatus for briquetting a powdered sample for spectrographic analysis and loading the briquette into an electrode crater without subsequent manual handling is described. The apparatus minimizes contamination and loss of sample, as well as the danger of electrode breakage upon loading. Illustrated. F.G.H.

Cold cathode X-ray diffraction tube. FRANK G. CHESLEY. *Rev. Sci. Instruments*, **14** [1] 3–5 (1943).—The design of a cold cathode X-ray diffraction tube and construction details for making it are given. The metal bellows incorporated in the cathode assembly permits adjustment of the cathode-target distance. Vertical fins provide adequate cooling without forced draft, and a simple target-sealing assembly permits rapid interchange of targets. R.H.B.

Development of the microscope objective. A. H. BENNETT. *Jour. Optical Soc. Amer.*, **33** [3] 123–28 (1943).—B. gives a summary of the contributions to the improvement of microscope objectives. With the more recent optical glasses and with the larger number of workers in optical design, more useful developments in objectives will continue to appear. A.P.

Electric furnace made of insulating firebrick. C. T. KINCAID. *Chemist-Analyst*, **32** [1] 23 (1943).—Cut two insulating firebrick to 5 x $4^1/_2$ x $2^1/_2$ in. Place the 5- x $4^1/_2$-in. faces together and trim to a cylinder. Hollow out the

cylinder to about $^{3}/_{4}$ in. wall thickness, leaving about three long projections for winding the heating element. Fasten the two halves together with sodium silicate cement or wire bands. About 28 in. of No. 20 nichrome coiled element gives enough heat to ash filter paper. A.P.

Electrical equipment troubles and how to solve them. H. W. ANDERSON. *Nat. Engr.*, **47** [8] 510 (1943).—Electrical equipment troubles are discussed, including blackened commutators and their remedy, the emergency use of a 3-phase induction regulator on single phase, and the operation of an induction motor on low voltage. M.R.

Electrophoretic dewatering of clay. SIDNEY SPEIL AND M. R. THOMPSON. *Trans. Electrochem. Soc.*, **81**, 119–45 (1942); partially reprinted in *Ceram. Age*, **40** [4] 106–108, 121 (1942).—The electroosmotic dewatering of both electrodialyzed and undialyzed clay was studied to determine the yield per faraday, the energy consumption per ton of dry clay, and the moisture content of the deposit. The effects of temperature, time of deposition, current density, electrode spacing, solids concentration, conductivity, type and amount of dispersant, and type of electrode were determined. The applications of Ohm's law to general machine design and of fundamental electrokinetic concepts to the dewatering process are discussed. These concepts complement the strictly electrochemical relations and are necessary in the study of clay, which does not have a fixed equivalent weight. An empirical equation is given which allows the determination of the "apparent current efficiency." Data on the dewatering of several clay types are summarized. Illustrated. See *Bull. Amer. Ceram. Soc.*, **20** [7] 244–45 (1941). F.G.H.

Experience in the use of electrostatic fly-ash precipitators. IRVIN G. MCCHESNEY. *Trans. Amer. Soc. Mech. Engrs.*, **65** [3] 143–48 (1943).—McC. discusses several years' experience with Cottrell electrostatic fly-ash precipitators. Early rod-curtain electrodes were modified following model studies carried out by the Research Corporation, Bound Brook, N. J. The improved design uses punched plates for collecting electrodes. The solutions of other operating problems, including distribution of gas, flue corrosion, and the design of by-pass ducts, are considered. Illustrated. F.G.H.

Experiences in fine grinding. JOHN L. SPEIRS. *Ceram. Age*, **40** [2] 37–39 (1942).—S. describes a patented jet pulverizer called the "Micronizer," in which, by means of high velocity gas streams, material is centrifugally held in the region of active pulverization until reduced and, when reduced, is swept radially inward out of the pulverizing zone by the same gas stream. Illustrated. See "Jet . . .," *Ceram. Abs.*, **17** [10] 334 (1938). F.G.H.

Film-forming products. ANON. *Rev. Sci. Instruments*, **14** [1] 26 (1943).—Film-forming products of the Glyco Products Co., Inc., Brooklyn, N. Y., include Durocer, Elastoseal, Sicaseal, and Aerawax. R.H.B.

High-temperature fans. ANON. *Mill & Factory*, **33** [1] 172 (July, 1943).—These fans are specifically engineered for temperatures up to 1500° and are offered in sizes of 800 to 40,000 cu. ft. per min. The fans can be mounted in 16 discharge positions without cutting or welding. Rotor, shaft bearing, and mounting can be pulled out as a unit for inspection and servicing. A.G.B.

Insulation material. JAMES M. CROWE. *Chem. Industries*, **52** [6] 745 (1943).—A new line of heavy-duty high-temperature pipe coverings and block insulation is produced by Munn and Steele, Inc. The new material (Mascolite) is a basic bonded vermiculite body for service at temperatures below 2000°F. E.D.M.

Measurement of anomalous dispersion in opaque dielectrics. A. W. LAWSON. *Rev. Sci. Instruments*, **14** [2] 38–43 (1943).—L. describes an apparatus by means of which the index of refraction of opaque materials may be determined as a function of wave length. The method is based essentially on the determination of Brewster's angle by the reflection of polarized light from a polished surface. Typical data are given, and the precision and accuracy of the method are discussed. R.H.B.

Measurement and control of liquid-steel temperatures. T. LAND. *Jour. Soc. Glass Tech.*, **27** [119] 22–31T (1943).—The application of "quick-immersion" thermocouples to the measurement of liquid-steel temperatures in open-hearth, electric arc, high frequency induction, and Bessemer converter furnaces is described. Details of the apparatus and of the procedure essential to ensure satisfactory results are given, and the value of the measurements which can be made is shown. Modifications of the quick-immersion method for temperature measurements of molten glass are suggested. R.H.B.

Photoelectric glossmeter. ANON. *Chem. Industries*, **52** [6] 748 (1943).—A new photoelectric glossmeter announced by Photovolt Corp. is designed for measuring the specular reflection of paints, varnishes, ceramics, paper, and machined or polished surfaces. A diagram of the apparatus is shown, and its operation is outlined. The specularly reflected light is measured by a barrier layer photocell. A second cell operates as a balance cell. The instrument is standardized against polished black glass. The indicating instrument is a pointer-type galvanometer of high sensitivity and comparatively rugged design so that the operation of the instrument is not confined to the laboratory. The instrument is available for power-line or battery operation. E.D.M.

Temperature-indicating compound in liquid form. ANON. *Machinery* [N. Y.], **49** [10] 174 (1943).—An emulsified compound known as "Tempilag," which dries immediately upon application and melts when a stated temperature is reached, is a recent product of the Tempil Corp., New York, N. Y. This temperature indicator works equally well on metal, glass, ceramic, plastic, or wood surfaces. It has been developed especially for use on polished surfaces, on the inside of tubes or castings, and on other inaccessible places such as overhead surfaces. The new compound is available in a range of compositions for indicating any temperature from 125° to 350°F. in 25° intervals and from 350° to 1600°F. in 50° intervals. See "Unique . . .," *Ceram. Abs.*, **22** [2] 36 (1943). R.H.B.

* **Ultrasonic fluorimeter.** G. GOUDET. *Compt. Rend.*, **214** [16] 742–44 (1942).—The instrument consists of a piece of quartz which can be excited by an a.-c. voltage to give ultrasonic oscillations which excite the substance to be investigated to fluorescence. The arrangement and the theory are explained. M.HA.

Vibratory shaker for laboratory use. A. R. GILSON. *Chem. & Ind.*, **62** [23] 214 (1943).—The device was designed to meet a need often felt in the laboratory for some simple means of shaking, vigorously and efficiently, small quantities of liquids or suspensions in bottles, conical flasks, test tubes, etc., and also for shaking liquids and solids in the presence of a gas, as required in low-pressure hydrogenation work. The apparatus consists of a spring steel strip or reed, approximately 12 in. long by $1^{1}/_{2}$ in. wide by $^{1}/_{16}$ in. thick, fixed at one end and attached at the other end, on one side, to a tension spring and, on the other side, to a wire cable from an adjustable eccentric. A $^{1}/_{2}$-in. diameter rod, approximately 9 in. long, is riveted to the center of the reed, and projects upward in a vertical position. It is clamped at the top end, through a rubber bush and a metal rod, to the stabilizing structure. The driving motor, $^{1}/_{16}$ to $^{1}/_{8}$ h.p., is bolted firmly to the underside of the platform and can be of the universal variable-speed or single-phase constant-speed type. In the former case, the eccentric is mounted directly on the motor shaft, thus simplifying construction. In the latter case, the eccentric is integral with a suitable stepped pulley and is mounted separately in a plain bearing attached to the underside of the platform. It is then operated by means of a short V-belt drive from the motor. The Bowden wire cable which connects the eccentric to the reed passes over a pulley. In operation, the lateral vibratory movement imparted to the end of the reed by means of the eccentric sets up a similar vibratory movement in the vertical rod, and this vibration is transmitted to what-

* Obtained from microfilm.

ever is attached to the rod. When mounted on rubber feet, the device is silent in operation. R.H.B.

BOOKS

Chemical Engineering Laboratory Equipment: Design, Construction, Operation. O. T. ZIMMERMAN AND IRVIN LAVINE. Industrial Research Service, Dover, N. H., 1943. 530 pp. Price $5.50. Reviewed in *Chem. Industries*, **52** [6] 747 (1943).—The book consists of contributions from various university laboratories on the design, construction, and testing of laboratory and pilot plant scale unit operation equipment under the following headings: flow of fluids, flow of heat, evaporation, drying, distillation, gas absorption, filtration, and crushing and grinding. For each piece of equipment listed there are design drawings, construction details, a bill of materials, approximate cost, a typical laboratory procedure, typical experimental data, and detailed calculations. E.D.M.

Electron Microscope. E. F. BURTON AND W. H. KOHL. Reinhold Publishing Corp., New York, 1942. 233 pp. Price $3.85. Reviewed in *Jour. Amer. Chem. Soc.*, **64** [12] 3060 (1942). F.G.H.

PATENTS

Air filter. P. S. DICKEY AND CLARENCE JOHNSON (Bailey Meter Co.). Can. 413,481, June 29, 1943 (Dec. 17, 1940; in U. S. Jan. 3, 1940). G.M.H.

Apparatus for mixing clay, clay soil, etc. EISENWERK WESERHÜTTE A.-G. Belg. 437,150, Dec. 30, 1939.—A pug mill is combined with a distributing plate. The latter is driven independently and turns more slowly than the grinder. In this manner the material which goes through the mill is deposited in a layer on the distributing plate. The layers are mixed and emptied by a helical screw conveyer. M.Ho.

Apparatus for working mineral materials, etc. C. J. BURCH AND G. H. SMITH (Linde Air Products Co.). U. S. 2,327,497, Aug. 24, 1943 (Dec. 7, 1940).

Blowtorch. C. J. BURCH (Linde Air Products Co.). U. S. 2,327,498, Aug. 24, 1943 (April 18, 1941).

Blowtorch. J. R. CRAIG (Linde Air Products Co.). U. S. 2,327,508, Aug. 24, 1943 (Jan. 7, 1942).—A blowtorch suitable for piercing a hole in a rock, etc.

Brick press. M. NORMAND. Belg. 434,247, June 30, 1939; addition to Belg. 383,106. M.Ho.

Deairing press for ceramic bodies. A.-G. ARTHUR RIETER. Belg. 435,088, July 8, 1939.—Structural details are given. M.Ho.

Electric oven for high temperatures working under vacuum or under neutral gas. FRANÇOIS MATHIEU (vested in the Alien Property Custodian). U. S. 2,328,479, Aug. 31, 1943 (Nov. 22, 1941).

Method of and apparatus for working mineral materials, etc. C. J. BURCH (Linde Air Products Co.). U. S. 2,327,496, Aug. 24, 1943 (Dec. 3, 1940).—Method of working mineral materials, etc., which comprises progressively melting material along a selected path and forming a fluid slag, quenching and solidifying the slag so formed, mechanically disintegrating the quenched slag, and removing the disintegrated slag from the region of disintegration.

Piezoelectric quartz element. S. A. BOKOVOY (Radio Corp. of America). Can. 413,894, July 13, 1943 (May 29, 1935). G.M.H.

Procedure and apparatus for rapid molding and vibrational compressing of hollow bodies shaped from paste. P. SALVANESCHI. Belg. 437,802, March, 1940.—The paste is poured onto a vibrating table. At a certain distance off the table a porous cylinder is turning. The paste is thrown onto the cylinder and compressed thereon by the vibrations of the table. M.Ho.

Process of and apparatus for working mineral materials, etc. C. J. BURCH (Linde Air Products Co.). U. S. 2,327,499, Aug. 24, 1943 (April 18, 1941).

Production of tile. C. JOLY. Belg. 434,476, June 30, 1939.—The tile is molded in a hermetically closed evacuated mold. M.Ho.

Saw for cutting stone, marble, etc. F. BANDINI. Belg. 437,104, Dec. 30, 1939. M.Ho.

Sieve for liquids. C.B.R. (CIMENTERIES ET BRIQUETERIES RÉUNIES) SOC. ANON. Belg. 435,118, July 8, 1939.—The sieve is used for removing solids from slime, viscous liquids, and especially from the crude paste prepared for calcining cement. Details of the construction are given. M.Ho.

Kilns, Furnaces, Fuels, and Combustion

Analyzing heat flow in cyclic furnace operation. New method simplifies determination of economic insulation thickness. C. B. BRADLEY AND C. E. ERNST. *Mech. Eng.*, **65** [2] 125–29 (1943).—The determination of optimum thickness of insulation for maximum economy in the operation of heated equipment under steady-state conditions has been a long-established practice. In the case of problems involving periodic or intermittent operation, however, the methods of solution previously available have not been found entirely practicable because with unsteady-state heat flow a number of variables are brought into play which introduce many and complex factors. A new tool of investigation, the "heat- and mass-flow analyzer," shows promise of solving problems of the latter type without the shortcomings of methods previously available. This analyzer, developed by V. Paschkis at Columbia University, is based on the analogy between certain electrical circuits and transient heat-flow phenomena. The authors discuss the determination of heat flow under unsteady-state conditions and report the comparative results of a heat-flow problem worked out both by the conventional direct-test method and by the new electrical analyzer. The latter gives results which check closely with the direct test. These results are obtained in much less time and without the need of building an actual test wall. The mechanical problems, with regard to calibration and manipulation of test equipment, are considerably reduced, which permits more extensive investigation as well as ease of reproducing results. Among the numerous applications of insulation involving unsteady-temperature conditions, where the electrical analyzer can be of considerable service, are the following: (1) It can be used to determine the average heat flow through a great variety of wall thicknesses and constructions to establish the most economical thickness and combination for a particular application. (2) In many insulation applications it is necessary to protect materials having high resistance to heat flow but low temperature resistance with materials of higher temperature resistance but lower efficiency. The ability of the analyzer to determine specific temperatures under unsteady heating operation enables the use of lesser thicknesses of the higher-temperature materials as compared with steady-state conditions. (3) In many applications of annealing furnaces, etc., it is necessary to control the cooling rate in accordance with the characteristics of the material being handled. A required cooling schedule can be met by a proper choice of materials and combination for the furnace wall which would give a heat loss through the wall to coincide with the cooling schedule. A specific wall construction would obviously be a function of the load in the furnace as well as the cooling schedule. (4) Another problem in connection with cyclic heating operations is to obtain operation of automatic temperature controls without undue hunting. This involves selection of a wall structure of such insulating value and heat capacity that it does not unduly oppose operation of the automatic control and cause it to function too often or with too great a temperature swing. Illustrated. F.G.H.

Bureau of Mines studies multiplicity of fuel problems. ANON. *Heating & Ventilating*, **40** [8] 40 (1943).—In addition to testing millions of tons of coal for the Army, the Bureau of Mines will continue to test coal and coke for new blast furnaces of the Defense Plant Corporation, produce motor fuel and oil from coal by hydrogenation, study the substitution of colloidal or coal-oil mixtures for fuel oil, seek to prevent the slag erosion of boiler tubes in electric power plants, and review the storage and combustion problems of war plants. With coal reserves of the Nation virtually unlimited, hydrogenation of coal is one of the Bureau objectives. One small pilot plant in operation uses the Bergius method. M.R.

Coal cost check chart. R. J. BUCHANAN. *Power's Data Sheet*, No. 126; *Power*, **87** [2] 133 (1943). F.G.H.

Coal-dump heating. H. MITCHELL. *Elec. Rev.*, **133** [3425] 83–84 (1943).—Risk of fire in coal piles varies according to the nature of the coal and the size and shape of the pile. M. suggests that 2- to 3-in. metal tubes be inserted in the pile at intervals of 20 ft. or less. They may be used to record the temperature of various parts of the pile or as a means of ingress for liquids to extinguish the fire. M.R.

Combined firing of coal and natural gas on stoker-fired units. H. L. CRAIN. *Trans. Amer. Soc. Mech. Engrs.*, **65** [3] 137–41 (1943).—Operating results obtained by the use of natural gas for 25 to 30% of the total fuel requirements are described in detail. Illustrated. F.G.H.

Combustion data for heavy fuel oil. A. BUTCHER. *Nat. Engr.*, **44** [6] 420, 422; [7] 486–87; [8] 599–600 (1940).—Economical use of heavy fuel oil or Bunker C oil requires some knowledge of the fuel and of combustion in general. Air requirements, products of combustion, computation of heat balance and combustion temperatures, and typical fuel oils are discussed. M.R.

Control of atmosphere in laboratory kilns. C. L. THOMPSON. *Bull. Amer. Ceram. Soc.*, **22** [9] 302–304 (1943).—1 reference, 5 figures.

Converting furnaces from oil to coal firing. R. M. HARDGROVE. *Mech. Eng.*, **65** [8] 573–80 (1943).—H. discusses the application of conversion methods to boiler and metallurgical furnaces. Illustrated. F.G.H.

* **Dimensioning of the rotary kiln.** E. ROCK. *Tonind.-Ztg.*, **66** [27–28] 288 (1942).—Formulas are derived and a table is given for the determination of the specific furnace capacity in tons per cubic meter as a function of the required daily capacity in tons. M.HA.

* **Firing of brick and clinker. Effect of firing conditions on the sintering process.** O. KRAUSE AND HSUN SHAN CHEN. *Tonind.-Ztg.*, **66** [23–24] 244–48; [37–38] 381–82 (1942).—The effect of firing temperature, duration of firing, and furnace atmosphere on the sintering process of brickwork products was investigated with five different clays in specially developed furnace systems between 750° and 1250°C. for 19, 60, 190, 600, and 1900 min. The sintering processes were recorded by measuring the linear and volume shrinkage and apparent and true porosity. The sintering process was found to depend on the same conditions as the structural changes. At low temperatures, the decrease in porosity is proportional to the content of feldspar-like constituents of the mass; at high temperatures, the sintering is superimposed by the melting of the iron (II) oxide-silicic acid eutectic. The furnace atmosphere determines the progress of sintering to a great extent. All clays investigated showed at 1250°, after the shortest firing time or at least 1 min., an increase in true porosity, while the apparent porosity did not change; this is ascribed to the disintegration of iron (III) oxide constituents which had not been reduced during firing. Conditions necessary for the production of fine ceramic products also govern the production of coarse ceramic products; the eutectic liquefaction of the feldspar-like constituents and of the iron (II) oxide with the silicic acid originating from the disintegration of the clay minerals and the action of this melt on the other clay constituents, particularly quartz, not only constitute the most important structural changes in the firing process but also determine the sintering processes and the sintering condition at the end of the firing. To obtain satisfactory mechanical strength, the most favorable firing temperature is 1150° to 1200°C.; within this range, the firing time has the least influence, as changes in the firing time neither increase nor decrease the properties noticeably. At 1250°C. such change becomes very pronounced. Because of their content of iron oxide, the brick masses depend largely on the furnace atmosphere. Ordinary products such as backing-up brick and drainpipe, where strength and not color is the prime object, are best fired so that first the organic constituents of the clay are burned out by maintaining an oxidizing furnace atmosphere up to 800° or 900°C., after which a predominantly reducing atmosphere should be used up to the highest firing temperature to obtain the most uniform sintering. Products of a higher quality must, in general, be treated similarly except that the reducing atmosphere must be followed by another oxidizing firing if a definite color, red or red brown, is desired. To obtain products with the greatest possible uniformity in mechanical properties, the brick mass should be as homogeneous as possible and free of coarse particles (rock) and should preferably be mixed in a vacuum mixer and formed in a vacuum press. The tunnel kiln is preferable to the ring kiln for firing. M.HA.

Floor flue construction in downdraft kilns. ANON. *Brit. Clayworker*, **51** [603] 41–43 (1942); reprinted in *Ceram. Age*, **40** [4] 104–105 (1942).—Fundamentals of floor and sub-flue construction and brick setting and firing are briefly reviewed. Illustrated. F.G.H.

* **Formation of easily soluble magnesium and alkali sulfates in lime-containing brick bodies during firing in a circular kiln.** A. STUTZ. *Tonind.-Ztg.*, **66** [23–24] 243–44 (1942).—The efflorescence occurring on ceramic products contains sulfates which are inherent in the body, e.g., $CaSO_4$, $MgSO_4$, Na_2SO_4, and K_2SO_4; $CaSO_4$ is most frequently found, but as it is also the least soluble, Na_2SO_4 and $MgSO_4$ are the most dangerous sulfates in the brick body. The formation is ascribed to the inclusions of pyrite in the clay which form SO_2 gases; the latter, if they cannot escape freely, form the sulfates. The SO_2 content of the furnace atmosphere cannot cause efflorescences. Fine grinding and intimate mixing reduce the danger of efflorescence. A not too closely placed charge, good draft, and a thin body also reduce efflorescence. M.HA.

Fuel economy in oil-fired plants. K. STEINER. *Heating, Piping and Air Conditioning*, **13** [8] 481–84 (1941).—In keeping with the presidential proclamation of unlimited emergency, fuel must be conserved. Methods for preventing waste of fuel in oil-fired boiler plants are described. The principal methods are (1) maintenance of mechanical equipment, (2) firebox maintenance, (3) prevention of firebox losses, (4) control of combustion process, and (5) maintenance of high rate of heat transfer. M.R.

Fuel outlook for the period of the war and future trends. JOHN M. DRABELLE. *Nat. Engr.*, **47** [7] 424–27 (1943).—The consumption of solid fuel is increasing, rationing is imminent, and manufacturers are advised to build up coal reserves. Liquid fuel will no longer be sold at a "get-rid-of" price, and the manufacture of synthetic rubber will curtail the supply of fuel oil. M.R.

* **Furnace draft in the firing of brick.** C. KABUS. *Tonind.-Ztg.*, **66** [25–26] 270–73 (1942).—Factors for the design of chimneys, stacks, and shafts which are dependent on barometric pressure, air temperature, composition of combustion gases, and their density are discussed. Methods of calculation are explained, and different types of design are described. See "Recent . . . ," *Ceram. Abs.*, **20** [7] 177 (1941). M.HA.

* **Furnaces for firing stoneware.** W. SCHUEN. *Tonind.-Ztg.*, **66** [33–34] 349–52; [35–36] 367–69 (1942).—The development of the systems of furnaces used in different countries for firing stoneware is discussed. The standard furnace in this industry is that in which the flame passes over from the combustion chamber to the heating chamber because of its definite direction, but the gas-fired chamber furnace is the best from the economical viewpoint. S.

* Obtained from microfilm.

recommends, however, that more exact investigations be made with regard to its heat balance. In general, the gas-fired chamber furnace requires two million Cal. per ton of stoneware, while the modern furnace with overpassing flame requires 3.6 million Cal. per ton. Tables of the heat content of combustion gases for the latter furnace with the theoretical and excess amounts of combustion air and for H, N, H_2O, and CO_2 up to 3000°C. are given. M.HA.

Heat capacities at higher temperatures of ethane and propane. BENJAMIN P. DAILEY WITH W. A. FELSING. *Jour. Amer. Chem. Soc.*, **65** [1] 42–44 (1943).—Experimental values for the heat capacities of air, ethane, and propane were determined over the temperature range 340° to 700°K. using a modified Bennewitz and Schulze type adiabatic flow calorimeter. The results obtained are compared with theoretical values and with the results of other investigators. The Bennewitz and Schulze calorimeter was modified to increase the ease of manipulation and to improve the accuracy of heat-capacity determinations at higher temperatures. Illustrated. F.G.H.

Heat capacities of and hindered rotation in *n*-butane and isobutane. BENJAMIN P. DAILEY WITH W. A. FELSING. *Jour. Amer. Chem. Soc.*, **65** [1] 44–46 (1943).—The gaseous heat capacities of *n*-butane and isobutane were measured over a range of 340° to 700°K. and are presented in tabular and graphic form. The structure of the two molecules is discussed in the light of these results. Illustrated. F.G.H.

Heat technical principles of the industrial use of gas. WAGENER. *Glashütte*, **72**, 133–37 (1942); abstracted in *Chem. Zentr.*, **1942, II** [12] 1421–22.—Adequate and constant pressure can be maintained by proper regulation of the flow and pressure. A higher thermal efficiency can be obtained by feeding the correct amount of air for combustion and lowering the temperature of waste gases. Losses from the accumulator, etc., which occur during operation should be kept as low as possible. The thermodynamic principles involved are explained and illustrated by sketches and tables. M.V.C.

How to figure hog-fuel combustion. G. L. GRAIFF. *Power*, **87** [5] 325, 353*b*–354*a* (1943).—Details covering the use of a hog-fuel combustion chart are given. Illustrated. F.G.H.

Iowa coals in the national emergency. H. L. OLIN. *Mech. Eng.*, **65** [5] 343–46 (1943).—The Iowa mines with their ample potential reserves are ready to meet moderately increased demands; the problems of storage, even if relatively more difficult than in other regions, are nevertheless susceptible to solution. The successful burning of Iowa coal depends only upon appropriate furnace design and adequate control. Illustrated. F.G.H.

Is colloidal oil an emergency fuel? ANON. *Mill & Factory*, **33** [1] 78 (July, 1943).—Colloidal fuel is finely ground coal mixed with fuel oil, the ratio being 60 oil and 40% coal to 70 oil and 30% coal. The advantages of colloidal fuel are as follows: (1) It can be used with the present oil-burning equipment. (2) It relieves the area that must curtail its fuel-oil consumption. (3) Its cost is comparable to that of present fuels. (4) The B.t.u. content is 1 to 4% higher than that of fuel oil. If the fused ash and pumping causes no more trouble than it did in experimental operations, this fuel offers promising postwar possibilities. A.G.B.

Liquid coal for oil conversions. T. W. REYNOLDS. *Heating & Ventilating*, **40** [7] 70–72, 93 (1943).—Colloidal fuel, which uses up low-grade coal and conserves fuel oil, has a lower ignition temperature and higher B.t.u. value than straight fuel oil. The preferred colloidal mixture is 40 to 50% coal and 60 to 50% oil. Conversion to colloidal fuel requires little change in equipment, and many large corporations are turning to this type. Through the use of the coal hydrogenation process to provide oil, colloidal fuel may eventually be obtained entirely from coal. M.R.

Meeting wartime fuel problems. OLLISON CRAIG. *Mech. Eng.*, **64** [10] 697–702 (1942).—C. discusses some of the problems arising from the transportation and use of lower-grade coals and indicates solutions to these problems. Illustrated. F.G.H.

Modern applications of overfire air. H. C. CARROLL. *Trans. Amer. Soc. Mech. Engrs.*, **65** [2] 73–86 (1943).—Overfire air supplied by steam jets has in the past proved to be an economical and effective means for improving combustion in furnaces. More recently, high-pressure air jets supplied by power-driven fans have been employed with great success. After stating the requirements, C. deals with typical applications of overfire air to furnaces equipped with various types of stokers. The use of the portable ultimate-gas-analysis machine in studying combustion conditions in furnaces and in making heat-balance tests is also described. Illustrated. F.G.H.

Modern stokers, due to research, well designed for current demand. T. F. J. MOFFETT. *Heating & Ventilating*, **40** [7] 62–64 (1943).—The fuel-oil situation focuses attention on coal burning. Stokers conserve both fuel and man power, and the steam output is increased 25% over hand firing. Research is constantly improving the design of stokers. M.R.

Oil-burning principles and operating procedure. J. A. HAYES. *Nat. Engr.*, **44** [9] 662–64, 666 (1940).—H. briefly discusses fuel-oil characteristics and nomenclature and grades of oil. The three principal methods of burning oil are described. The care and operation of oil burners and their peculiarities are also discussed. M.R.

Recent developments in spreader-stoker firing. R. L. BEERS. *Mech. Eng.*, **64** [12] 867–71 (1942).—Illustrated. F.G.H.

Recent progress in heat transfer. C. H. LANDER. *Jour. Proc. Inst. Mech. Engrs.* [London], **148**, 81–112 (Jan., 1943); *Science Abs.–A*, **46**, 862 (April, 1943); see *Ceram. Abs.*, **21** [9] 203 (1942). H.K.R.

Selection of coal for the power plant. H. J. PETERS. *Nat. Engr.*, **46** [7] 430–32 (1942).—The sulfur content of Illinois and Indiana coals is high. Ash is undesirable except with chain-grate stokers, where it protects the chain from heat. The moisture of most coals ranges from 3 to 10%, except in wash screenings, in which the moisture content is higher. Coal is sized according to coal company standards. Five reasons are given why coal used by a plant may be unsatisfactory. M.R.

Utilizing pulverized coal in the metallurgical industries. C. F. HERINGTON. *Trans. Amer. Soc. Mech. Engrs.*, **65** [5] 393–400 (1943).—Following a brief outline of the early history of pulverized-coal firing, H. describes in some detail typical equipment which constitutes a modern installation best adapted for use in metallurgical furnaces. The relative effectiveness of burners is dealt with by examples. Coal-distribution systems, including the pneumatic-transport system, are discussed, special note being taken of the advantages of the latter type. Control systems are also considered, and operating data and cost figures are presented. Illustrated. F.G.H.

Value of coal analysis to the power engineer. R. B. TEXTOR. *Nat. Engr.*, **47** [8] 488–93 (1943).—A great responsibility falls on the power-plant engineer today in the selection of a suitable grade and class of coal. The cost of coal and efficient operation must be considered not only in the original selection but in succeeding deliveries. Two real fuel constituents are volatile combustible matter and fixed carbon. The price per million B.t.u. provides a preliminary basis for the comparison of coals. Fuel cost per 1000 lb. of steam provides a final basis. Moisture is objectionable. The chemistry of clinkers, laboratory functions, proper coal sampling, and the use of analyses are also discussed. M.R.

What the Dow Chemical Co. learned about coal storage. ANON. *Nat. Engr.*, **44** [9] 682–83 (1940).—This company uses a thousand tons of coal daily. A coal-handling technique has been developed to eliminate fires. Piles have horizontal rather than oblique strata. M.R.

PATENTS

Battery of continuous furnaces for firing brick, etc. R. POSKIN. Belg. 434,121, June 30, 1939.—The furnace consists of two parallel galleries connected at their ends

by two passages. The fire passes from one gallery into another through these passages. The draft is supplied by one or more movable electric blowers. The blowers draw air through apertures in the shell of the furnace. M.Ho.

Sheathed electrode. Soc. Anon. Esab. Belg. 437,328, Jan., 1940.—The electrode's sheath is made of a composition containing TiO_2, SiO_2, Al_2O_3, alkaline-earth oxides, and CO totaling at least 60% by weight. Of these, TiO_2, SiO_2, and Al_2O_3 amount to at least 35% by weight. M.Ho.

Geology

Calcium in the soil. R. Bradfield. *Soil Sci. Soc. Amer., Proc.*, **6**, 8–15 (1941).—B. discusses physicochemical relations of the system soil–$CaCO_3$–CO_2–H_2O. Calcium is the most abundant cation in exchangeable form. W.R.B.

Ceramic raw materials situation—priorities and deliveries. A. F. Greaves-Walker. *Ceram. Age*, **40** [5] 137–38 (1942).—G.-W. briefly reviews the raw material situation with respect to the nonmetallic minerals of ceramic importance. F.G.H.

Clay minerals of the montmorillonite group. C. S. Ross and S. B. Hendricks. *Soil Sci. Soc. Amer., Proc.*, **6**, 58–62 (1941).—The molecular structure of the montmorillonite clay minerals is discussed with the aim of explaining base-exchange properties. From the structure and from the chemical analyses of 100 specimens, definite formulas were given to many of the montmorillonite minerals. W.R.B.

Electron micrographs of clay minerals. B. T. Shaw and R. P. Humbert. *Soil Sci. Soc. Amer., Proc.*, **6**, 146–49 (1941).—Electron micrographs supply information concerning the shape, size, characteristic habit, and surface features of the clay minerals. Electron micrographs of montmorillonite, nontronite, illite, beidellite, kaolinite, halloysite, dickite, and cecil clay are illustrated. Montmorillonites show fluffy amorphous structures to well-defined extremely thin plates. Nontronite is characterized by flat frayed fibers. Kaolinite and dickite both have hexagonal plate-shaped crystals. Dickite crystals are much thicker than kaolinite crystals. Halloysite is characterized by long split rods. See "Studies . . . ," *Ceram. Abs.*, **21** [11] 246 (1942). W.R.B.

Fertilizer by fusion of rock phosphate with olivine. J. H. Walthall and G. L. Bridger. *Ind. Eng. Chem.*, **35** [7] 774–77 (1943).—By fusing a mixture of rock phosphate, magnesia, and silica and rapidly cooling the melt, it is possible to make a product with a high proportion of its P_2O_5 content soluble in citrated ammonium nitrate solution. Olivine, a mineral magnesium silicate found in abundance in the Tennessee Valley, is an economical source of magnesia and silica for the fusion process. A fusion of 1 lb. of rock phosphate and 0.46 lb. of olivine yields a product containing 22.8% total P_2O_5 and 21.4% soluble P_2O_5. One fourth to one third of the fluorine in the rock phosphate is volatilized in the process. Pot culture tests indicate that the P_2O_5 of the product is practically as effective as that of superphosphate; the magnesium content should prove advantageous. Because of the inexpensive raw materials and the simplicity of the process, the cost of the product should be favorable in comparison with that of other phosphatic fertilizers. Illustrated. F.G.H.

Gabbro-granodiorite contact in the Slieve Gullion Area and its bearing on Tertiary petrogenesis. D. L. Reynolds. *Quart. Jour. Geol. Soc. London*, **97** [385] 1–38 (1941).—The thermal metamorphism of a gabbro by intrusion of a granodiorite is described in detail. Variation diagrams based on the chemical analyses of the altered rock suite were drawn to show the chemical changes attending the metamorphism. In these diagrams, FeO, CaO, and MgO show marked concentration at the zone of contact. FeO and CaO remain close to the contact, while MgO has a slight tendency to migrate from it. Silica and K_2O have been driven from the zone of most intense alteration. Experiments of F. D. Adams (*Ceram. Abs.*, **9** [10] 876 (1930)), in which two refractory bodies, (1) Austrian magnesite brick and (2) a dolomite-mill scale (Fe_3O_4) batch were heated in contact, were compared with the natural metamorphism described above. In these bodies SiO_2 and Al_2O_3 moved away from the contact back into brick 1. Some Al_2O_3, CaO, and Fe_2O_3 transferred from brick 2 to brick 1. A comparison is drawn between the diffusions of material in the artificial and natural cases. The results are discussed in the light of a theory of Tertiary petrogenesis. S.Z.

X-ray diffraction procedure for positive differentiation of montmorillonite from hydrous mica. M. L. Jackson and N. N. Hellman. *Soil Sci. Soc. Amer., Proc.*, **6**, 133–45 (1941).—The authors studied the influence of the character of base saturation and conditions of drying of clay minerals on the intensity and relative position of the (001) line in the X-ray diffraction pattern to make possible a positive identification and differentiation of the montmorillonite and hydrous mica groups in soil clays and in certain naturally occurring clay deposits. Results are given of X-ray diffraction analyses of 45 fine clays from soils and bentonites. W.R.B.

BOOK

World Minerals and World Peace. C. K. Leith, J. W. Furness, and Cleona Lewis. The Brookings Institution, Washington, D. C., 1943. 253 pp. Price $2.50. Reviewed in *Chem. Industries*, **53** [1] 98 (1943).—The physical, economic, and political trends are presented, with an analysis of the possibilities of controlling minerals to prevent preparation for war in the future. The authors trace the growth of world mineral production, "new" minerals for industry introduced during the past twenty years, the present mineral position of nations and of present belligerent groups, international control schemes such as monopolies and cartels, the commercial policies involved in world mineral trade, nationalization measures taken by certain nations to control their mineral sources, etc. E.D.M.

Chemistry and Physics

Applications of spot reactions: I, Detection and estimation of small amounts of potassium permanganate in the presence of much chromate. F. Feigl and H. A. Suter. *Chemist-Analyst*, **32** [1] 4–6 (1943).—As an example of the advantages of spot tests as supplements to systematic inorganic analysis and in chemical examinations of industrial materials, rocks, and minerals, permanganate is detected in the presence of much chromate. A drop of test solution acts on paper, and MnO_2 separates and is localized by capillary action. **II, Rapid detection of reducing compounds.** F. Feigl and G. F. Dacorso. *Ibid.*, [2] 28–32.—Phosphomolybdic acid gives a strong blue color in acid solutions of reducing compounds: free metals, lower valences, sulfides, sulfites, iodides, etc. Applications to the detection of free metals, of metallic zinc or lead in their oxides, and of sulfide in pigments are described. A.P.

Certain singular points on crystallization curves of solid solutions. N. L. Bowen. *Proc. Nat. Acad. Sci.*, **27** [6] 301–309 (1941).—The course of curves of crystallization in a ternary system having two components which form a complete series of solid solutions, with minimum, with each other and each of which forms a eutectic with the third component is discussed. An isothermal plane above the temperature of the minimum in the solid solution series

shows 3 series of liquids, only one of which (the one associated with the third component) is in equilibrium with a solid of constant composition; the other two are in equilibrium with solid solutions whose compositions can be represented on the diagram by tie lines. An isothermal plane taken below the solid solution minimum temperature shows but two series of liquids. Equilibrium crystallization as contrasted with fractional crystallization (the liquid and all of the solid are not in equilibrium) is discussed in detail. The curves of equilibrium crystallization can be derived from those of fractional crystallization and vice versa. The process of crystallization in a hypothetical system is described in detail. S.Z.

Conversion of magnesite to periclase. BRUCE L. BAILEY. *Trans. Electrochem. Soc.*, **81**, 89–96 (1942).—A series of 90 grit samples of magnesite was calcined at temperatures ranging from 900° to 1650°C. in a small molybdenum-wound tube furnace (hydrogen atmosphere). The calcination loss was measured for each sample together with the rehydration gain after the sample had been exposed to the atmosphere for about 12 hr. The rehydration gain dropped sharply after calcination at 1200°C. and became practically negligible after calcination for 25 min. at 1650°C. The petrographic examination indicated qualitatively that the conversion of periclase paralleled the drop in rehydration and was almost complete at 1300°C. Illustrated. F.G.H.

Crystal structure of Pb_3O_4. S. T. GROSS. *Jour. Amer. Chem. Soc.*, **65** [6] 1107–10 (1943).—The crystal structure of minium, Pb_3O_4, has been determined from X-ray intensity values; application of the coordination theory confirmed these positions and placed the oxygen ions. The plumbic ions are associated in chains of coordinated oxygen octahedra with opposite edges shared; they are practically identical, even to the dimensions, with those found in lead dioxide. These chains are arranged in a parallel manner, so that shared and unshared oxygen ions from adjacent chains approach closely in such a manner that three oxygen ions are coordinated with each plumbous ion. The plumbous-ion arrangement is practically the same as that in red PbO, so that the structure can be considered as basically built up from PbO (r) units and PbO_2 units. The space group as based upon the structure is taken as $P\bar{4}b2$. Illustrated. F.G.H.

Determination of fluorine as lead chlorofluoride. W. KAPFENBERGER. *Aluminium*, **24** [12] 428–32 (1942).—In determining the F ion as lead chlorofluoride, Pb acetate should not be used as a precipitation agent because of the formation of Pb oxychloride which falsifies the F values and gives too high amounts and also because Pb fluoride can be formed as an impurity. In the F analysis of Al fluoride and cryolite, the following products can be obtained:

Compound	Solubility (gm./liter)
PbOHCl	0.114–0.260
PbClF	0.325
PbF_2	0.64
$PbCl_2$	10.8
Na_3AlF_6	0.39
K_3AlF_6	1.27

A method was developed which, though rather lengthy, permits the determination of PbClF more exactly in F solutions than any other known method. The sample used can contain 10 to 130 mgm. F. M.HA.

Determination of free iron oxides in colloids. M. DROSDOFF. *Soil Sci. Soc. Amer., Proc.*, **6**, 131–32 (1941).—A simple, efficient method for determining free iron oxides in soil colloids is presented. Their removal will simplify the determination of other clay minerals by X-ray and thermal methods. W.R.B.

* **Determination of silicon dioxide in Portland cement by normal analysis and by rapid methods.** ANON. *Tonind.-Ztg.*, **66** [21–22] 221–22 (1942).—A new rapid determination of the constituents of Portland cement is described which takes little more than an hour. Five different samples of clinker powder or cement are made up: (1) 2 gm. for determining loss by annealing; (2) 1 gm. for determining the insoluble portions in HCl and eventually for the gypsum check ($BaSO_4$); (3) 1 gm. for determining SiO_2 + HCl-insoluble portions, Al_2O_3 + iron oxide, calcium oxide, and Mg oxide; (4) 1 gm. for the separation of Fe from Al with a simultaneous repeated check of SiO_2; and later (5) 1 gm. for determining free CaO by the method of Schläpfer-Bukowski. The determinations are made in a known manner. M.HA.

Heat capacities and entropies of molybdenum and tungsten trioxides. HARRY SELTZ, F. J. DUNKERLEY, AND B. J. DEWITT. *Jour. Amer. Chem. Soc.*, **65** [4] 600–602 (1943).—The heat capacities of MoO_3 and WO_3 were determined from about 65° to 298°K. The entropy at 298.1°K. of MoO_3 is found to be 18.68 ± 0.3 cal. per °C., and that of WO_3 is 19.90 ± 0.2 cal. per °C. The complete $\Delta F°$ equations of formation of the two oxides are computed. Illustrated. F.G.H.

Heat content of manganese dioxide and carbonate at high temperatures. G. E. MOORE. *Jour. Amer. Chem. Soc.*, **65** [7] 1398–99 (1943).—The heat contents of manganese dioxide and manganese carbonate above room temperature were determined up to 505° and 320°C., respectively. The data are summarized by means of tables and algebraic equations. See "High . . . ," *Ceram. Abs.*, **21** [10] 224 (1942). F.G.H.

Heats of formation of manganomanganic oxide and manganese dioxide. C. HOWARD SHOMATE. *Jour. Amer. Chem. Soc.*, **65** [5] 785–90 (1943).—The heat of formation of manganomanganic oxide was obtained by two solution methods involving the use of (1) sulfuric acid-potassium iodide solutions and (2) sulfuric acid-ferrous ammonium sulfate solutions. The results of the two methods agree, the mean value being $\Delta H_{298.16} = -331{,}650 \pm 250$ cal. per mole. The heat of formation of manganese dioxide was obtained by two solution methods involving the use of sulfuric acid-ferrous ammonium sulfate solutions, both with and without the use of hydrogen peroxide. Agreeing results were obtained, the weighted mean of which is $\Delta H_{298.16} = -124{,}640 \pm 200$ cal. per mole. See *Ceram. Abs.*, **21** [10] 223–24 (1942). F.G.H.

Hydrothermal study of equilibria in the system alumina–water. A. W. LAUBENGAYER AND R. S. WEISZ. *Jour. Amer. Chem. Soc.*, **65** [2] 247–50 (1943).—The system alumina–water was studied by the hydrothermal method in the temperature range 100° to 500°C. The phases involved were identified by X-ray and microscopic methods. Corundum is the stable phase above $450° \pm 5$°C. γ-Alumina is metastable throughout the range investigated. Diaspore is stable below $450° \pm 5$°C., and the lower limit for its stability seems to be around 280°C. Boehmite apparently is stable between 155° and 280°C. Gibbsite is unstable above 155°C. Bayerite is unstable above 155°C., while the indications are that it is less stable than gibbsite below this temperature. Diaspore was prepared in the laboratory for the first time. The value of seeding in phase-rule studies is again demonstrated. Illustrated. F.G.H.

New fluorescence reaction for the detection of boric acid. K. NEELAKANTAM AND L. R. ROW. *Proc. Indian Acad. Sci.*, **16A**, 349–58 (Nov., 1942); *Science Abs.–A*, **46**, 1061 (May, 1943).—None of the metallic radicles examined interferes, while among the acid radicles, chromate, bromate, chlorate, nitrite, and fluoride interfere to a limited extent. The test is applicable to microquantities of H_2BO_3. H.K.R.

Optical transmission of quartz glass. A. SCHRAUB. *Physik. Z.*, **43** [3–4] 64–69 (1942); *Science Abs.–A*, **46**, 1057 (May, 1943).—Measurements are made of the transmission of quartz glass over the wave-length range 212 to 644 μ and are compared with existing data. Molten quartz, in contrast to crystalline quartz, absorbs strongly toward the short wave lengths, starting at 260 μ. The fluorescence which occurs is in the violet and neighboring long-wave ultraviolet region. The strong absorption referred to precludes the use of large quartz glass lenses

* Obtained from microfilm.

and prisms for the purpose of obtaining high light intensities with spectroscopic apparatus. H.K.R.

Petrology and silicate technology. NORMAN L. BOWEN. *Jour. Amer. Ceram. Soc.*, **26** [9] 285–301 (1943).—23 references, 15 diagrams.

pH Determinations. H. D. CHAPMAN, J. H. AXLEY, AND D. S. CURTIS. *Soil Sci. Soc. Amer., Proc.*, **5**, 191–200 (1940).—An effort is made to determine the practicability of measuring the pH of soils at field moisture content. With Beckman-type glass electrode equipment, pH readings could be obtained on soils at moisture contents as low as the air-dry state, but these are unreliable. The glass electrode should be thoroughly wetted in order to get reliable, reproducible readings. Tests on soils at or near the sticky point gave constant and consistent results. Such pH measurements should be applicable to clays or clay mixtures in the plastic state. W.R.B.

Physical reflections in a chemical mirror. R. E. GIBSON. *Jour. Wash. Acad. Sci.*, **31** [8] 325–48 (1941).—The origin and development of the various theories of solution from the first half of the 17th century to date are discussed in the light of modern knowledge. S.Z.

Red zinc oxide. WILLIAM EHRET AND ARTHUR GREENSTONE. *Jour. Amer. Chem. Soc.*, **65** [5] 872–77 (1943).—A report is made on several modes of preparation of a red-colored zinc oxide. The most generally suited method is to heat white zinc oxide with ammonium nitrate. The results of chemical and X-ray diffraction analyses of red zinc oxides lead to the conclusion that their common characteristic is an excess of zinc, about 0.02%. The following physical properties of red zinc oxide were measured: color values, particle size, density, solubility in dilute alkali, and photoconductance. The possible causes of color in zinc oxide are discussed. The authors favor the *F* center hypothesis although no positive evidence for it is at hand. Illustrated. F.G.H.

Relation between viscosity and density of liquids and liquid mixtures. M. K. SRINIVASAN. *Phil. Mag.*, **32** [212] 253–58 (1941).—An equation relating viscosity to density is discussed: $\log \eta = \alpha + \frac{\beta}{\rho_0 - \rho}$, where α, β, ρ_0 are constants. The equation holds fairly well for associated and unassociated liquids over wide ranges of temperature. It holds for certain associated liquids, such as tertiary alcohols, even though the association changes with temperature. It does not hold for water. If it is assumed that the density changes linearly with temperature over short ranges, the equation is similar to that of Andrade and fits the data equally well. The equation was tested with data for octane, other organic liquids, and gallium. S.Z.

Specific heats at low temperatures of magnesium orthosilicate and magnesium metasilicate. K. K. KELLEY. *Jour. Amer. Chem. Soc.*, **65** [3] 339–41 (1943).—The specific heats of Mg_2SiO_4 and $MgSiO_3$ were measured in the temperature range 51° to 298°K. The corresponding entropies were computed as $S_{298.16} = 22.7 \pm 0.2$ cal. per mole per degree for Mg_2SiO_4 and $S_{298.16} = 16.2 \pm 0.2$ for $MgSiO_3$. Illustrated. See *Ceram. Abs.*, **21** [2] 50 (1942). F.G.H.

Specific heats at low temperatures of manganese carbide and manganese dioxide. K. K. KELLEY AND G. E. MOORE. *Jour. Amer. Chem. Soc.*, **65** [5] 782–85 (1943).—The specific heats of manganese carbide and manganese dioxide were measured in the temperature range 51° to 298°K. Manganese dioxide has a marked anomaly in its specific-heat curve with the peak at 92.12° ± 0.05°K. The total heat absorbed between 85° and 100°K. was measured as 102.5 cal. per mole. The following entropy values were computed: $S_{298.16} = 23.6 \pm 0.3$ cal. per mole per degree for manganese carbide and $S_{298.16} = 12.7 \pm 0.1$ for manganese dioxide. The calculated free energies of formation from the elements are $\Delta F°_{298.16} = -22{,}800$ cal. per mole and $\Delta F°_{298.16} = -109{,}900$ cal. per mole, respectively, for the carbide and the dioxide. Illustrated. F.G.H.

Study of ionic adsorption in solutions of silica and alumina. P. G. NUTTING. *Jour. Wash. Acad. Sci.*, **32** [4] 117–22 (1942).—The electrometric titration of silica solutions containing different concentrations of KOH was performed. The first addition of KOH made the solution more acid (by one pH unit), while further additions finally permitted the completion of the titration to neutrality. Similar results were obtained when alumina solutions were titrated by KOH. The addition of HCl to solutions of K_2SiO_3 or $KAlO_2$ first increases the alkalinity, but further additions yield a neutral solution. Other examples are noted. The effect can be attributed to the adsorption of ions on the micelles of silica or alumina until the adsorption is sufficient to pass the potential hump and complete the intended ionic reaction. S.Z.

Time and temperature effects in the formation of colloidal dispersions. P. G. NUTTING. *Jour. Wash. Acad. Sci.*, **31** [2] 41–45 (1941).—A colloidal dispersion bears an analogy to a solution in that it has a definite concentration limit affected by temperature and the presence of foreign substances. A very pure bentonite (montmorillonite) was placed in acid solution and held at 28° and 93°C., respectively, for a specified time. Saturation at 93° was reached in 4 days, but at 28° it was not reached in 128 days. The solutions were filtered (so that the upper limit in particle size was 0.1 μ) and analyzed. Although pure water is saturated with 0.418 gm. silica per liter at 90°, these solutions contained 0.85 gm. per liter. The presence of the bases of alumina, lime, etc., increased the solubility or dispersion of the silica. These colloids are precipitated on drying. The occurrence of montmorillonitic clay in rock seams or filling cavities can be explained on the basis of these data. S.Z.

Use of powders in spectrochemical analysis. A. E. RUEHLE AND E. K. JAYCOX. *Jour. Optical Soc. Amer.*, **33** [2] 109–12 (1943).—Instead of being dried on the supporting electrode, the solution of the sample is dried separately and thoroughly mixed in the powdered state. This permits admixture of a buffer, prevents soaking into the electrode, and gives a more representative sample. In the analysis of refractory materials, the 2000 volt a.-c. arc is recommended. A.P.

Variation of viscosity of liquids with temperature. M. K. SRINIVASAN AND B. PRASAD. *Phil. Mag.*, **33** [219] 258–71 (1942).—Seven equations expressing the relation of viscosity to temperature were examined and tested with data on organic liquids and fused metals. The simple equation of Andrade (*Nature*, March 1, 1940, and April 12, 1930), $\eta = Ae^{b/T}$, was found to be as precise as his modified equation, $\eta v^{1/3} = Ae^{\frac{cv}{T}}$, where A, b, and c are constants and v is the specific volume. These equations are based on the assumption that the transfer of momentum in liquids takes place by molecules of adjacent layers coming in close contact for some time rather than by transfer of material particles. The equation holds for associated liquids providing the association is not a function of temperature. Silverman's equation, $\eta = kv/T \cdot e^{\frac{Q}{RT} - cT}$, where k, Q, and c are constants (*Trans. Faraday Soc.*, **29**, 285 (1933)), requiring a knowledge of the density, gave good results for unassociated liquids and some metals. This equation assumed that some structure in the liquid was breaking up and being re-formed again. Madge's equation, $\eta = \frac{Ae^{BT}}{T - b}$, where A, b, and B are constants (*Jour. Phys. Chem.*, **34**, 1599 (1930)), treated liquids as a case of an elastic solid when the material breaks down under stress rather than a matter of diffusion as in gases. The equations of Madge, Andrade, and Silverman apply fairly well to unassociated organic and metal liquids over wide ranges of temperature. S.Z.

Viscosity-temperature functions of liquids. A. H. NISSAN. *Phil. Mag.*, **32** [215] 441–56 (1941).—The viscosity-temperature relationship for various liquids can be expressed as a simple polynomial series provided the temperature term is properly chosen. The temperature term used in the series was T/T_B, where T is the absolute temperature of the measurement and T_B is the boiling

point of the liquid measured. The equation proposed would have the following form:

$$\text{Log } \eta = K + K_1(T/T_B) + K_2(T/T_B)^2 + K_3(T/T_B)^3 \ldots$$

The equation was tested for liquids of organic and inorganic composition showing various degrees of association. A procedure is given for determining the number of terms necessary in the equation. Numerous graphs are shown. **Discussion.** E. P. IRANY. *Ibid.*, **33** [224] 685–88 (1942).—The graphical method employed by Nissan for making the η–T curves linear is discussed. Irany claims priority on the method and discusses several applications. S.Z.

BOOK

Dictionary of Science and Technology in English, French, German, Spanish. MAXIM NEWMARK. Philosophical Library, Inc., New York, 1943. 386 pp. Price $6.00. Reviewed in *Chem. Industries*, **52** [6] 747 (1943).—The book contains 10,000 current terms in the English language most frequently used in the polytechnical and scientific fields and their French, German, and Spanish equivalents, synonyms, and definitions. There are also listed conversion tables and a system of cross references of the more extreme variations between American and British technical terminology. E.D.M.

PATENTS

Ceramics. J. W. WHITTEMORE AND C. R. OBERFELL (Mead Corp.). U. S. 2,326,729, Aug. 10, 1943 (March 15, 1938).

Heavy magnesium oxide manufacture. W. H. MACINTIRE. Can. 413,297, June 22, 1943 (Sept. 16, 1940; in U. S. Oct. 23, 1939). G.M.H.

Improved procedure for the production of titanium pigments. TITANGESELLSCHAFT M. B. H. Belg. 437,017, Dec. 30, 1939; addition to Belg. 427,799.—The TiO_2 colloidal sol used in the manufacture of titanium pigments is produced by mixing a titanium salt of a monovalent anion with such quantity of preheated water that after dilution the colloidal salt appears in a concentration of 5 to 120 gm. per liter calculated as TiO_2. M.Ho.

Making heavy magnesium oxide. W. H. MACINTIRE (American Zinc, Lead & Smelting Co.). U. S. 2,328,286, Aug. 31, 1943 (Oct. 23, 1939).—The process which comprises suspending dolomite, calcined selectively to a composition of substantially calcium carbonate and magnesium oxide, in an aqueous solution of a member of the group consisting of magnesium sulfate, magnesium chloride, and magnesium nitrate, the concentration of magnesium salt in the solution being 5 to 25%, introducing sufficient carbon dioxide gas under pressure of three or more atmospheres into and without heating the suspension to effect carbonation and dissolution of the magnesium oxide, separating undissolved calcium carbonate from the solution, heating the solution to boiling, separating the resulting precipitate of heavy magnesium carbonate from the solution, and then calcining the magnesium carbonate to produce heavy magnesium oxide.

Making titanium-containing pigments. A. T. MCCORD (Sherwin-Williams Co.). U. S. 2,326,156, Aug. 10, 1943 (Aug. 1, 1940).—The process of making a titanium-containing pigment which includes the steps of forming a slurry of an extender and a titania hydrate, both in solid form, in water containing a quantity of sulfuric acid in the proportion of less than 2.47 H_2SO_4 to 1 part TiO_2 by weight, the hydrate showing on X-ray analysis the pattern characteristic of γ-titanic acid, boiling the slurry, and separating the mixed solids from the acidified water.

Manufacturing black pigment. DEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT VORM. ROESSLER. Belg. 437,746, Feb., 1940.—A mixture of CuO, Cr oxide, or substances yielding these is heated with substances known in the ceramic industry as mineralizers at a temperature of 800° to 1100°. As mineralizers, WO_3 and $(NH_4)_2MoO_4$ are primarily used. M.Ho.

Titanium dioxide production. S. P. TODD AND E. S. HAYS, JR. (Sherwin-Williams Co.). Can. 413,723, July 6, 1943 (March 26, 1941). G.M.H.

Titanium-pigment composition and process of making. S. P. TODD, H. F. SAUNDERS, AND F. C. VERDUIN (Sherwin-Williams Co.). U. S. 2,326,182, Aug. 10, 1943 (Nov. 27, 1940).—The process of preparing a titanium oxide pigment which includes calcining a hydrous titanium oxide obtained by precipitation from a solution of a complex titanium ammonium fluoride, to which has been added, after precipitation and washing, a compound of a metal of group II of the periodic table.

Titanium salt solution. L'R. G. BOUSQUET AND D. W. YOUNG (General Chemical Co.). Can. 413,356, June 22, 1943 (March 4, 1941; in U. S. March 29, 1940). G.M.H.

General

Accident-prevention film helps conserve man power. L. S. METCALFE. *Glass Ind.*, **24** [7] 297, 313 (1943).—Two safety-training motion pictures emphasize the prevention of accidents in the plant and away from it. A.P.

Burning wood refuse as fuel under power-plant boilers. J. A. WIKEL. *Nat. Engr.*, **47** [8] 496–99, 501 (1943).—Early practice was lacking in many respects, and some modern plants are still wasteful. Newer designs of fuel-supply systems and furnaces provide efficient operation. Automatic feeders for wood refuse are important. The moisture content of the refuse may exceed 50%, but such excessive moisture requires a special furnace design. M.R.

Ceramic industries and their place in the war effort. ARTHUR S. WATTS. *Ohio State Univ. Eng. Expt. Sta. News*, **14** [5] 21–27 (1942); reprinted in *Ceram. Age*, **41** [2] 56–57, 59–60 (1943). F.G.H.

Ceramic school activities in 1943. ANON. *Ceram. Age*, **41** [6] 188–95 (1943).—A survey is presented covering the following institutions: (1) University of Alabama, (2) University of Southern California, (3) Georgia School of Technology, (4) University of Illinois, (5) Iowa State College, (6) Massachusetts Institute of Technology, (7) Missouri School of Mines and Metallurgy, (8) New York State College of Ceramics, (9) Ohio State University, (10) North Carolina State College, (11) Pennsylvania State College, (12) Rutgers University, (13) University of Texas, (14) Virginia Polytechnic Institute, and (15) University of Washington. F.G.H.

Clay-products-plant conversion. ANON. *Pit & Quarry*, **36** [1] 39–40 (1943).—The War Production Board urges that clay-products plants situated in wooded sections be converted to charcoal production. This can be easily done for about $150 per kiln. Present charcoal production is not sufficient for military needs. An average kiln can produce 35 tons of charcoal per month. The WPB Building Materials Division is sending conversion instructions to all clay-products plants in wooded areas. M.R.

Correlated abstract of literature on flowability and deformation of sands. P. E. KYLE AND F. R. EVANS. *Amer. Foundryman*, **5** [1] 4–8 (1943).—A review of the work done is presented, and the problems involved in an investigation of what the term "flowability" really means are discussed. No standard test has yet been devised. M.A.S.

Developments in ceramic substitutions for vital materials. ANON. *Clay Products News*, **16** [8] 2–6 (1943).—A report issued by the Ceramic Advisory Committee for Canada outlines the present progress and future possibilities of substitutions in fire clay, glass, porcelain enamel, and whiteware for various war-scarce materials. G.A.K.

Electronics in industry. C. J. MADSEN. Abstracted in *Heating & Ventilating*, **40** [8] 55 (1943).—M. discusses

electronics applied in rectification, inversion, high-frequency heating, communications, measurements, control, inspection and sorting, precipitation, and radiation. M.R.

Fineness of clay-free sands determined by rapid methods. O. J. MEYERS AND R. KATTUS. *Amer. Foundryman*, **5** [7] 17 (1943).—Two methods for calculating the grain fineness number in screen analyses of clay-free sands to reduce the time spent in the computations are discussed. The more rapid method utilizes a nomograph. M.A.S.

Foreman training sound slidefilm made available to glass industry. LYNE S. METCALFE. *Glass Ind.*, **24** [4] 166–67 (1943).—Because of the wartime man power problems, the Carnegie-Illinois Steel Co. has augmented its foreman supervisory training program with a series of five sound slidefilms. A.P.

Foundry sand research: I and II. H. REIS. *Amer. Foundryman*, **3** [2] 11–13; [3] 11–13 (1941).—R. comments on the action taken by the Foundry Sand Research Committee of the American Foundrymen's Assn. on the various tests and pieces of equipment which the committee recommended for use in the foundry as a means for sand control but which have proved to some extent to be inefficient in actual foundry practice. M.A.S.

Ful-Vue safety goggle. ANON. *Machinery* [N. Y.], **49** [11] 228 (1943).—A new Ful-Vue safety goggle with curved clear Super Armorplate lenses, designed to protect the eyes of women industrial workers, has been marketed by the American Optical Co., Southbridge, Mass. R.H.B.

Fundamentals of boiler feed water conditioning. E. B. WOODRUFF. *Nat. Engr.*, **46** [1] 28–33 (1942).—Proper steam plant water control should (1) eliminate scale and sludge deposits, (2) prevent corrosion of metal surfaces, (3) prevent priming and foaming and reduce "carry-over," and (4) retard caustic embrittlement. External treatment is done by means of evaporation, filters, settling basins, and softeners. Internal treatment uses the following chemicals: soda ash, sodium aluminate, sodium hydroxide, sodium phosphate, sodium sulfate, sodium sulfite, and tannin. The majority of plants require some combination of both methods. Acid corrosion of metals is prevented by maintaining the water definitely alkaline. Dissolved oxygen is also a cause of corrosion. This form of corrosion is controlled by (*a*) prevention of air leakage in the system, (*b*) oxygen removal by flashing or heating in a vented heater, and (*c*) the addition of substances which absorb oxygen. Carry-over is injurious to much equipment outside of the boiler plant. Suitable water treatment and the proper blowing down of the boiler will reduce carry-over. Much new equipment has been designed to help control carry-over. There is no standard method, which will apply in all cases, for the prevention of caustic embrittlement. M.R.

How belt efficiency affects profits. H. J. MONTGOMERY. *Nat. Engr.*, **47** [8] 494 (1943).—The basis of belt transmission is laid on the principles of friction. Care must be exercised to guard against excessive tension as well as belt slippage. The first is expensive, as the belts wear out faster; the second is also costly because production is curtailed. Suitable weight, width, and quality of belt are important. M.R.

How to stay in business during the war and thereafter. M. C. CONICK. *Amer. Glass Rev.*, **62** [42] 10, 20–21 (1943).—Sound methods of cost accounting and expense control are advocated. The continuance of any enterprise depends largely upon the courage, character, and intelligent thinking of the management. A.P.

Is scientific research to be strangled? F. W. PRESTON. *Glass Ind.*, **24** [6] 257, 262 (1943).—P. comments on Senate Bill 702 introduced by Senator Kilgore to establish an Office of Scientific and Technical Mobilization. A.P.

Length of material on drum. W. F. SCHAPHORST. *Chem. Industries*, **52** [6] 759 (1943).—To determine the number of feet of material on a drum properly wound, four measurements are necessary: *h*, depth of material on the drum (in.); *s*, diameter of the drum (in.); *l*, length of the drum (in.); and *d*, diameter of the rope, wire, etc. (in.). To the depth of the rope (*h*) add the diameter (*s*); multiply by *h* and then by thei nside length of the drum (*l*). Divide by the square of the diameter of the rope (*d*) and multiply by 0.262 to get the length in feet. E.D.M.

Milman H. Linn, Sr., fifty years a progressive potter. ANON. *Bull. Amer. Ceram. Soc.*, **22** [9] 301–302 (1943).—1 photo.

New and revised definitions of foundry sand terms approved. ANON. *Amer. Foundryman*, **4** [7] 20–21 (1942).—Both old and new definitions of foundry sand terms are listed. M.A.S.

Present status of ceramic research. GEORGE A. BOLE. *Ceram. Age*, **40** [6] 170–71, 184 (1942).—B. briefly reviews wartime developments in various fields of ceramic research. F.G.H.

Rapid methods of analyses for sand control in magnesium foundries. E. M. CRAMER. *Amer. Foundryman*, **4** [12] 11–12 (1942).—When inhibitors are present in improper quantities in magnesium foundry sands, they not only have a detrimental effect on the metal itself but also jeopardize the production of quality castings. It is therefore essential that the quantity of inhibitor present be controlled. C. suggests chemical methods. M.A.S.

Stop vibrations and noise. W. F. SCHAPHORST. *Chem. Industries*, **52** [6] 759 (1943).—Three sketches indicate two methods of fastening machinery to the floor, using a layer of cork to stop vibrations. E.D.M.

Thirty-seven wartime hints for accident prevention in glass plants. E. W. FAIR. *Glass Ind.*, **24** [8] 340, 358 (1943).—Definite suggestions for the elimination of avoidable accidents are listed. A.P.

Toledo Engineering participating in projects closely identified with war efforts. ANON. *Amer. Glass Rev.*, **62** [40] 26 (1943).—The Toledo Engineering Co. has designed, engineered, and installed melting equipment for the Research Enterprises, Ltd., and Corning Glass Works optical glass plants and furnaces for a magnesium smelting plant. It has also developed a self-contained batch charger. A.P.

Trends in technical education. WILLIS H. CARRIER. *Ceram. Age*, **41** [5] 155–56 (1943); see *Bull Amer. Ceram. Soc.*, **21** [12] 313 (1942). F.G.H.

PATENTS

Concentrating minerals by decantation and flotation. A. PEARSON. Belg. 434,641, July 8, 1939.—The relative proportions of fine and coarse particles in the dispersed phase are used to adjust the viscosity of the suspension to maintain a constant specific gravity of the suspension. M.Ho.

Concentrating minerals by flotation. B. KALINOWSKI. Belg. 434,709, July 8, 1939.—The aqueous pulp is heated at 35° to 60° or more in the presence of a soap. The mineral thereby becomes activated, while the gangue becomes depressed. Following this treatment the pulp is floated, either hot or after cooling. M.Ho.

Dewatering schists or flotation residues. WESTFALIA-DINNENDAHL-GRÖPPEL A.-G. Belg. 434,653, July 8, 1939.—The separated schists are placed in a classifier which separates the fines from the coarse material. The latter is dewatered in a filter, and the fines are conveyed to a sedimentation tank. M.Ho.

Heating or cooling granulated material. N. AHLMANN. Belg. 434,730, July 8, 1939.—The material is lifted on an endless screw into a vertical receptacle. The dimensions and the velocity of the screw conveyer are so calculated that the material impinges onto the wall of the receptacle and thence travels upward along a low-pitch helical path. This procedure is particularly suitable for treating cement, granulated minerals, etc. M.Ho.

THE BULLETIN SECTION

Volume 22 October 15, 1943 Number 10

MEMBERSHIP ROSTER OF THE AMERICAN CERAMIC SOCIETY

The Roster of paid members is being published for the use of the members of The Society. The list is alphabetical; Corporation Members are in black-face type, the name of the voting representative following in parentheses; Fellows are preceded by*; Institute of Ceramic Engineers are preceded by †; Charter Life, Life, Honorary, and Student Members are indicated after their respective names.

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Bliss, L. Ganong, 607 Custis Rd., Glenside, Pa.
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Bonnot Co. (B. T. Bonnot), Canton, Ohio
Bonnot, B. T., Bonnot Co., Canton, Ohio
Booth, Franklin, Sierra Talc Co., 2149 Bay St., Los Angeles 21, Calif.
Booth, Seaver H., 40 Franklin St., Ansonia, Conn.
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†Bowne, Martin S., Lee Clay Products Co., Clearfield 5, Ky.
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The following members of this Society are in fighting units of war service. There are several in service in Washington not included in this Service Roster. This list, which was begun in September, 1942, and added to each succeeding month, is probably not complete, and we would appreciate information on other members.

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* These are in addition to the lists published monthly, beginning with the September, 1942, *Bulletin*, with the exception of the June, 1943, issue.

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February 21, 1943	2095	267	10	451	220	3043
March 21, 1943	1765	262	8	416	220	2671
April 21, 1943	1909	266	18	442	220	2855
May 21, 1943	1931	280	15	438	220	2884
June 21, 1943	1950	283	14	441	220	2908
July 21, 1943	1968	290	11	455	220	2944
August 21, 1943	1992	294	6	475	220	2987
September 21, 1943	2021	295	6	487	220	3029

IN SPITE OF THE LARGE LOSS OF FOREIGN MEMBERS AND SUBSCRIBERS, THERE IS AN INCREASE IN NUMBER OF MEMBERSHIP SUPPORTERS OF THE SOCIETY.

ALL DUES ARE DEDUCTIBLE UNDER THE PROVISIONS OF THE FEDERAL INCOME TAX LAW.

NEW MEMBERS IN SEPTEMBER

Personal

ARCHBOLD, WALTER H., JR., Kleyona, Phoenixville, Pa.; A. P. de Sanno & Son, Inc.

EUSTON, JACOB H., 79 W. Monroe St., Chicago 3, Ill.; supervising engineer, Business Research Corp.

HUBER, HAROLD V., 691 S. Harvard Blvd., Los Angeles 5, Calif.

MCNUTT, HAROLD M., 724 N. Victory Blvd., Burbank, Calif.; superintendent, West Coast Pottery.

MULRYAN, HENRY, 417 S. Hill St., Room 926, Los Angeles 13, Calif.; consulting geologist and mining engineer.

ROBERTS, ARTHUR H., 1208 Eastern Parkway, Brooklyn, N. Y.; B. G. Spark Plug Corp., Ridgefield, N. J.

*SIMMONS, ROBERT M., 3269 Casitas Ave., Los Angeles 26, Calif.; manufacturer of ceramic artware.

STEINBRUNN, HERMAN F., 1348 College Ave., Palo Alto, Calif.; instructor.

Student

New York State College of Ceramics: HENRY H. NAKAMURA.

University of Illinois: GORDON H. JOHNSON AND EDWARD P. MURPHY, JR.

* Indicates former member of The Society rejoining.

MEMBERSHIP WORKERS' RECORD

Personal

Mrs. A. R. Dyer	1	Ralston Russell, Jr.	6
	Office 1		

Student

R. L. Cook	1	M. E. Holmes	1
	F. A. Petersen 1		
		Grand Total	**11**

HONORING PRESIDENT CECIL E. BALES

Past-President of the Ohio Ceramic Industries Association
Present President of The American Ceramic Society

Informal Reception and Cocktail Party
Friday, October 22, 4:30 p.m.,
At the Executive Offices, 2525 North High St., Columbus, Ohio

Members of O.C.I.A. and of The American Ceramic Society, their ladies, and guests are cordially invited

SALUTE TO SOME OF OUR MEMBERS

Robert F. Ferguson

ROBERT F. FERGUSON

Robert F. Ferguson, a member of The American Ceramic Society since 1918, has been appointed to the research staff of Battelle Memorial Institute, Columbus, Ohio. Mr. Ferguson has been assigned to the Institute's division of ceramics, where he will be engaged in research in the field of glass technology.

A graduate in chemistry of the University of Pittsburgh, Pittsburgh, Pa., Mr. Ferguson has had a varied and noteworthy career in the physical sciences. After the completion of his technical education in 1916, he became associated with the Carr-Lowrey Glass Co., Baltimore, Md., where he was employed for one year. In 1917, he went to Mellon Institute, Pittsburgh, Pa., as an assistant on phosphate fertilizers research, where he remained until 1918, when he joined the Chemical Warfare Service and was stationed at the Development Division in Cleveland, Ohio.

Following the first World War, he returned to Mellon Institute as a junior fellow on refractories. While thus engaged, he assisted in the early exploitations of the Missouri diaspores and the magnesite deposits of Washington and participated in the development of many of the tests now adopted as standard for testing refractories.

In 1924, Mr. Ferguson became associated with the Garfield Refractories Co., Bolivar, Pa., where he participated in the discovery and exploration of the Kittanning Point fire-clay field, which has been in commercial production ever since. This work lasted for three years; then he returned to Mellon Institute to continue his work on the development of test procedures for refractories. In connection with this work, he introduced the use of statistical methods in evaluating routine test data, which tool had previously been employed almost exclusively in biological research.

Mr. Ferguson left Mellon Institute in 1934 to join the technical staff of the Hazel-Atlas Glass Co., Zanesville, Ohio, where he remained until his recent appointment to Battelle. His work at Hazel-Atlas was concerned with problems of glass production, and he made many contributions to the glass-manufacturing art in his work on improving the surface of pressed glassware, increasing the strength of glass containers, improving the weathering resistance of glass containers, and evaluating the melting performance of glass furnaces.

During the twenty-five years he has been a member of The American Ceramic Society, he has served on its Publications Committee and Committee on Refractories Bibliography and has held various Local Section offices. He recently served on the Glass Container Association Ring Section Subcommittee.

Mr. Ferguson founded the Pittsburgh Clay Workers Club and the "40 and 8" of the Pittsburgh Section, which achievement he regards as the most worthy of his professional career.

M. C. SHAW APPOINTED MANAGER OF ORTON FOUNDATION

The executive committee of the Edward Orton, Jr., Ceramic Foundation, Columbus, Ohio, has appointed Myril Clement Shaw as manager to succeed George A. Bole, who has found it necessary to be relieved of his duties to devote more of his time to directing research at the Ohio State University Engineering Experiment Station. Dr. Bole, however, is continuing with the Orton Foundation in a consulting capacity.

Myril Clement Shaw

Dr. Shaw, a Fellow of The American Ceramic Society, has been associated with the Orton Foundation since 1934 and has been assistant manager since 1936. He is well known through his various research and production activities pursuant to the improvement of pyrometric cones and through his industrial sales and service contacts for the Foundation.

Born in Columbus, Ohio, November 4, 1907, Dr. Shaw attended grade school in Pittsburgh, Pa., and Alfred, N. Y. While attending high school, he moved with his family to State College, Pa., where he finished his high school education in 1925. Continuing his studies at The Pennsylvania State College, he received his B.S. degree in 1929 and M.S. degree in 1930. While in college, he worked as checker and shipper of Koppers refractories for the Harbison-Walker Refractories Co., Hays Station, Pittsburgh, Pa. (in 1929) and as a research engineer doing general refractories research for the same company (in 1930).

From 1930 to 1934, as research engineer at the Ohio State University Engineering Experiment Station, he conducted research on the application of flotation as a method of beneficiating clay. During this time, he was working toward his Ph.D. degree, which he received in 1934. Immediately afterward, he became associated with the Orton Foundation.

Dr. Shaw has been a member of The American Ceramic Society since 1928 and is affiliated with the Materials and Equipment Division. He is also a member of the Institute of Ceramic Engineers and is a registered professional engineer in the State of Ohio.

He has been active in the Central Ohio Section, having served as secretary from 1936 to 1937 and from 1939 to 1942 and as chairman from 1937 to 1939.

Publications

(1) (With J. B. Shaw) "New Process for Producing Vitrified Products," *Brick & Clay Record*, **76** [4] 243; [6] 282–88 (1930); *Popular Sci.*, **116** [5] 50 (1930); *Ceram. Ind.*, **14** [5] 556 (1930); *Arch. Rec.*, **67** [4] 396 (1930).

(2) (With J. B. Shaw and G. J. Bair) "Progress Report on Development of Abrasion Test for Refractories at High Temperatures," *Jour. Amer. Ceram. Soc.*, **13** [7] 427–36 (1930).

(3) (With G. A. Bole, Wilber Stout, and D. Schaap) "Lawrence Clay of Lawrence County, Ohio," *Geol. Surv. Ohio*, Series 4, Bull. No. 36, 134 pp. (1932); also published as *Ohio State Univ. Eng. Expt. Sta. Bull.*, No. 67, 134 pp. (March, 1932).

(4) "Cleaning Low-Grade Clays," *Ceram. Age*, **20** [6] 220–21 (1932).

(5) "Removal of Iron from Clay by Skin Flotation," *Ceram. Ind.*, **21** [2] 88 (1933).

(6) (With R. F. Rea) "Freezing of Pyrometric Cones," *Jour. Amer. Ceram. Soc.*, **19** [7] 192–95 (1936).

(7) "Clay Refining by Flotation Methods," *Bull. Amer. Ceram. Soc.*, **16** [7] 291–94 (1937).

Patents

(1) (With W. B. Pine and J. B. Shaw) "Vitrified Argillaceous Product," U. S. 1,809,214, June 9, 1931.

(2) (With W. B. Pine and J. B. Shaw) "Making Vitrified Argillaceous Products," U. S. 1,809,215, June 9, 1931.

(3) (With W. B. Pine and J. B. Shaw) "Vitrified Argillaceous Products," Brit. 366,498, Feb. 17, 1932.

N. W. TAYLOR WITH MINNESOTA MINING & MANUFACTURING COMPANY

Nelson W. Taylor, Head of the Department of Ceramics at The Pennsylvania State College, State College, Pa., has resigned his position, effective November 1, to take charge of ceramic research for the Minnesota Mining & Manufacturing Co., St. Paul, Minn. This Company has a large business in abrasives, glazed mineral roofing granules, Scotch tape, and other products.

A detailed account of Dr. Taylor's activities before becoming associated with The Pennsylvania State College in 1933 is given in his biographical sketch which was published in the February, 1943, *Bulletin*, pp. 50–51.

CURTIS R. WATTERS

Curtis R. Watters, ceramic engineer, has been appointed to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of ceramic research.

Curtis R. Watters

Mr. Watters, who holds a Bachelor of Ceramic Engineering degree from Ohio State University, Columbus, Ohio, has had fifteen years' experience in industrial ceramics, most of which has been in the porcelain enameling field. Before going to Battelle, he was associated with the Salem Engineering Co., Salem, Ohio, and earlier he had held positions with the Alliance Porcelain Products Co., Alliance, Ohio, and the Mullins Corporation, Warren, Ohio.

Mr. Watters is a former member of The American Ceramic Society.

NECROLOGY

WILLIAM C. DENISON

William C. Denison, president of the Ohio Clay Co., Cleveland, Ohio, died September 10, 1943, at his home in Cleveland.

A native of Licking County, Mr. Denison spent his boyhood in Delaware, Ohio, and after attending Ohio Wesleyan University, started one of the first drain-tile plants in Ohio in partnership with his brother.*

Responsible for the initial movement to introduce hollow building brick and ceramic fireproofing tile in general building construction during his early work in the ceramic industry, Mr. Denison, as head of the Ohio Clay Company, invented and patented the Denison Interlocking Tile. His Cleveland plant was also the first of its kind to adopt the tunnel-kiln firing process for hollow building tile.

Mr. Denison is survived by his widow, Edith Talmage Denison; two sons, William C., Jr., president of the Denison Engineering Co., Columbus, Ohio, and George W. Denison, vice-president of the Ohio Clay Co., Cleveland; and one daughter, Mrs. Harold H. Neale of Cleveland.

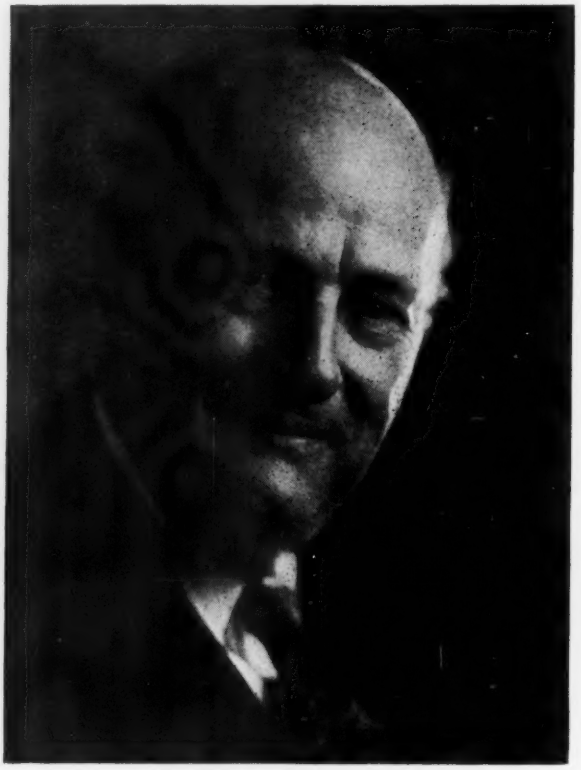
Mr. Denison's third son, Leonard A., died July 19, 1943, in Cleveland (see *Bull. Amer. Ceram. Soc.*, **22** [9] 322 (1943)).

* See also "The Denison Family," *Bull. Amer. Ceram. Soc.*, **22** [6] 167–72 (1943).

CHARLES H. MODES

Charles H. Modes, for many years prominent in the ceramic industry, died August 21, 1943, in Monroe, La., following a lingering illness.

Mr. Modes, a native of St. Louis, Mo., was a member of the third generation of a family of glassmakers. His grandfather came to the United States from France in 1820. His father, J. I. Modes, received posthumously the original United States letters of patent for a continuous glassmelting furnace.



Charles H. Modes

Mr. Modes was educated at the University of Nebraska and, like his father and grandfather, excelled in ceramics. He at times had lectured at various schools and colleges on this subject and had collaborated with the Department of Ceramic Engineering at the University of Illinois, Urbana, Ill., and the Department of Ceramic Engineering at the Missouri School of Mines and Metallurgy, Rolla, Mo., which Department he assisted in establishing.

During his career in industry, Mr. Modes had been engaged in various supervisory capacities with the Modes Glass Company, the A. M. Foster Glass Company, the Western Glass Manufacturing Company, the Western Chemical Company, the Illinois Glass Company, and the

Latchford Glass Company. He had been employed in various plants of the Illinois Glass Company (now the Owens-Illinois Glass Company) from 1918 to 1929, when he left because of poor health. He was later employed by the U. S. Engineer's, having accepted a position with the Government after plans for the operation of a Bastrop, La., glass plant fell through in 1933.

He had been a member of The American Ceramic Society for many years, having served as vice-chairman of the Glass Division in 1926 and as chairman of the St. Louis Section in 1927. He was also a member of the Society of Glass Technology.

Mr. Modes had resided in Monroe for the past ten years, where he had been a member of the First Methodist Church.

He was married six years ago to Miss Mae McIntosh who survives. He also leaves four daughters and one son by a former marriage namely, Mrs. E. A. Emery and Mrs. Byron Martin, Cleveland, Ohio; Mrs. Howard Rice, Kankakee, Ill.; Miss Rachel Modes, Alton, Ill.; and Ford S. Modes, Godfrey, Ill.

NEWS ITEMS

CERAMIC ASSOCIATION OF NEW YORK

The annual meeting of the Ceramic Association of New York will be held at the New York State College of Ceramics, Alfred, N. Y., October 16, 1943. The program will consist of the reading of papers and discussions on the following problems:

(1) Use of New York Talc in Ceramic Bodies
  (*a*) Purification of New York talc
  (*b*) Properties of steatite bodies made with New York Tremoline, New York Purified, and California talc
(2) Preparation of Ceramic Bodies
  (*a*) Adding clay to fire clay-grog bodies as slip
  (*b*) Influence of inorganic and organic electrolytes
  (*c*) pH of some ceramic raw materials
  (*d*) Effect of wetting agents on some properties of slips
  (*e*) Treatment of clay in colloidal mills
(3) Heavy Clay Products Investigations
  (*a*) Resistance of brick to freezing
  (*b*) Making insulating firebrick in brick plants
  (*c*) Cause and prevention of splitting of Hudson River brick
(4) Enamels
  (*a*) Use of zirconium compounds as opacifiers in enamels
(5) Whiteware
  (*a*) Development of a cookingware body
  (*b*) Penetration of glazes into ceramic bodies
  (*c*) Control of warpage by "freezing" body
(6) Gypsum
  (*a*) Effect of different deflocculants on serviceability of pottery plaster molds
(7) Cements, Lime, and Mortars
  (*a*) Development of standard wick for measuring efflorescence caused by cement, lime, and other masonry mortar materials
  (*b*) Use of Brabender plastograph to measure workability of masonry mortars and ceramic bodies
(8) Refractories
  (*a*) Production of fire-clay brick with low-temperature grog
  (*b*) Effect of CO gases on refractories
  (*c*) Cold-bonded fire clay-grog firebrick
  (*d*) Deairing of dry-press brick
  (*e*) Topaz-kyanite-fire clay mixtures for refractories
  (*f*) Use of organic deflocculants in refractory bodies

ANNUAL FALL MEETING OHIO CERAMIC INDUSTRIES ASSOCIATION

A splendid technical program is being prepared for this meeting, which will be held at the Ohio State University, Columbus, Ohio, October 22 and 23. Saturday afternoon, October 23, the delegates will attend the football game between Ohio State and Northwestern University. A block of 125 seats has been reserved for this game.

GLASS RESEARCH INSTITUTE

An Institute devoted to fundamental research in glass is now in the process of formulation.

At the invitation of Woldemar A. Weyl, professor of glass technology at The Pennsylvania State College, State College, Pa., representatives of leading companies interested in the development and use of glass met at the Hotel Biltmore, New York, N. Y., August 17 to select an organizing committee to prepare a charter for the new Institute.

The original sponsors of this Institute are the American Optical Co., Southbridge, Mass.; the Bausch & Lomb Optical Co., Rochester, N. Y.; the Corning Glass Works, Corning, N. Y.; the Eastman Kodak Co., Rochester, N. Y.; and the Pittsburgh Plate Glass Co., Pittsburgh, Pa.

It is expected that membership in the new Institute will be open to all companies interested in glass research. The Institute will establish laboratories whose location will be decided upon at a later meeting of the organizing committee.

OPTICAL SOCIETY OF AMERICA

The annual meeting of the Optical Society of America, including a Conference on Applied Spectroscopy, was held in Hotel Webster Hall, Pittsburgh, Pa., October 7 to 9, 1943.

A program of interest to scientists engaged both in theoretical and in practical applications of optics was presented.

The Spectroscopy Conference this year replaced the Summer Conference on Spectroscopy and Its Applications formerly held at the Massachusetts Institute of Technology, Cambridge, Mass., and the spring conferences formerly held in the Midwest and at the University of Pittsburgh, Pittsburgh, Pa.

UNIVERSITY OF ILLINOIS

The Department of Ceramic Engineering at the University of Illinois, Urbana, Ill., is operating on a year-round schedule of three semesters. Under this accelerated program, the fall semester started October 9. Although the enrollment in the civilian program has shown a sharp decrease, there is still considerable activity in the Department. Several of the engineering students enrolled in the Navy V-12 program are taking the regular courses in the Department of Ceramic Engineering. In addition, the facilities of the Department are being used to carry on research programs for both the Army and Navy in addition to the normal research work.

NEW ENGLAND HANDICRAFTS EXHIBIT

Worcester Art Museum

An Exhibition of Contemporary New England Handicrafts is being held at the Worcester Art Museum, Worcester, Mass. Opened October 13 with a private showing for members of the Museum, exhibitors, and invited guests, the Exhibition will remain on view through Sunday, December 26.

Five hundred objects made during the last five years, including examples of pottery, wood carving, turning, and furniture making, textiles, metalwork, basketry, and stained glass, have been installed in the Museum's five temporary exhibition galleries. Selection of the exhibits was facilitated by many handicraft organizations which collected representative work of entire regions, e.g., Middlesex County, Mass., and the State of New Hampshire, thus making it possible for a member of the Advisory Committee, a representative of the local handicraft organization, and the director of the Exhibition for the Museum to choose the outstanding work of a region against

a background of the handicrafts ordinarily made there. Selection has been based on excellence of design, taking into consideration the use for which the object is intended, the relationship of the material to the design, and quality of workmanship.

Objects made in rural areas by farmers and their families for their own use have been included, together with the skilled commissioned work of the professionally trained craftsmen of the cities. Although objects made in the English tradition of craftsmanship which has flourished in New England from Colonial times hold an important place in the Exhibition, there is a colorful and varied representation of many other craft traditions, e.g., French Canadian, Polish, Scandinavian, and Russian, which play a most important part in the complete picture of Contemporary New England Handicrafts.

Demonstrations of handicraft techniques are being held during the Exhibition, and an illustrated catalogue has been published.

AMERICAN FOUNDRYMEN'S ASSOCIATION

The Wisconsin Chapter of the American Foundrymen's Association met September 10, 1943, at the Schroeder Hotel, Milwaukee, Wis.

The program presented in part is as follows:

GRAY IRON SECTION (*Chairman*, FRANK WALDENMEYER)

(1) "Latest Developments in Ladle Additions" by CHARLES BURGESS, Union Carbide and Carbon Co.

STEEL SECTION (*Chairman*, CHARLES FUERST)

(1) "Furnace and Ladle Refractories" by GEORGE J. BARKER, Dept. of Mining and Metallurgy, Univ. of Wisconsin, Madison, Wis.

Discussion Leader, C. E. Bales, President, The American Ceramic Society.

(2) Color film, "Ladle and Pouring Practices" by S. E. MCGINTY, Firegan Sales Co.

REFRACTORIES WITH OPA

The first meeting of the Refractories Industry Advisory Committee, composed of twenty-four executives of companies engaged in the production of refractory products, was held September 17, 1943, in Washington, D. C.

After organization, the Committee discussed the pricing problems of the refractories industry under Maximum Price Regulation 188 (Manufacturers' Maximum Prices for Specified Building Materials and Consumer Goods Other than Apparel) which covers all refractory products, with the exception of basic refractories, which are priced under Maximum Price Regulation 416 (Basic Refractories Products).

The membership of the Committee represents the various industry groups such as fire-clay, silica, basic, special, and insulating refractories and high-temperature bonding mortars.

The industry is engaged in the annual production and distribution of $100,000,000 worth of refractory products. Of vital importance in the war production program, the industry's principal consumers are the manufacturers of iron and steel, nonferrous metals, glass, oil, and cement, and the transportation and power industries. Domestic requirements are small but essential and involve linings for stoves, fireplaces, and other heating units.

Members of the Committee are as follows: J. B. Arthur, President, Mexico Refractories Co., Mexico, Mo.; C. E. Bales, Vice-President, Ironton Fire Brick Co., Ironton, Ohio; J. L. Crawford, General Manager, Walsh Refractories Corp., St. Louis, Mo.; W. H. France, Vice-President, J. H. France Refractories Co., Snow Shoe, Pa.; A. P. Green, President, A. P. Green Fire Brick Co., Mexico, Mo.; Floyd L. Greene, President, General Refractories Co., Philadelphia, Pa.; Roger A. Hitchins, President, National Refractories Co., Inc., Philadelphia, Pa.; Otis L. Jones, President, Illinois Clay Products Co., Joliet, Ill.; A. H. Killinger, Vice-President, Laclede-Christy Clay Products Co., St. Louis, Mo.; Charles Knupfer, Vice-President, Carborundum Co., Perth Amboy, N. J.; Fred B. Ortman, President, Gladding, McBean & Co., Los Angeles, Calif.; W. H. Peterson, President, M. D. Valentine & Brothers Co., Woodbridge, N. J.; J. E. Brinckerhoff, Sales Manager, Babcock & Wilcox Co., New York, N. Y.; W. B. Coullie, Vice-President, Harbison-Walker Refractories Co., Pittsburgh, Pa.; George A. Price, Vice-President, Diamond Fire Brick Co., Canon City, Colo.; D. D. Davis, President, Davis Fire Brick Co., Oak Hill, Ohio; John D. Ramsay, President, North American Refractories Co., Cleveland, Ohio; John G. Remmey, President, Richard C. Remmey Son Co., Philadelphia, Pa.; John T. Roberts, President, Stockton Fire Brick Co., San Francisco, Calif.; W. E. Robinson, President, Robinson Clay Product Co., Akron, Ohio; W. P. Stevens, President, Atlantic Refractories Co., Macon, Ga.; Ralph L. Swank, Vice-President, Hiram Swank's Sons, Johnstown, Pa.; Clifford R. Taylor, President, Charles Taylor Sons Co., Cincinnati, Ohio; W. A. Turner, President, McLain Fire Brick Co., Pittsburgh, Pa.

KILL THE KILGORE BILL

Patent Commissioner Coe stated during the hearings before the Temporary National Economics Committee that 83% of the patents issued went to small companies and individuals and 17% to the large corporations. The following table covers the detailed data:

Patents issued in 1938	Average Per Cent
Large corporations	17.2
Small corporations	34.5
Foreign corporations	5.4
Individuals	42.9

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420 Lexington Avenue, New York, N. Y. 624 California Street, San Francisco, Cal.
444 Lake Shore Drive, Chicago, Illinois 550 South Flower Street, Los Angeles, Cal.

PITTSBURGH DISTRICT SECTION HAS TWENTY-FIFTH ANNIVERSARY MEETING NOVEMBER 16

Record of First Meeting*

At a meeting held at the Mellon Institute, University of Pittsburgh, Pittsburgh, Pa., December 19, 1918, the merging of the former Beaver Section into the Pittsburgh District Section was completed. Morning and afternoon sessions were held.

At the opening of the morning session, by-laws were adopted and the following officers were elected for the ensuing year: R. R. HICE, *Chairman;* C. R. PEREGRINE, *Vice-Chairman;* THOMAS H. SANT, *Treasurer;* F. H. RIDDLE, *Secretary;* and F. W. WALKER, SR., *Councillor.*

After the election of officers, a varied and interesting program of technical papers was afforded as follows:

"Industrial Research," E. W. TILLOTSON, Mellon Institute.

"Effect of Some Fluxes on Porcelain," F. H. RIDDLE, Bureau of Standards.

"Influence of Some Ball Clays upon the Casting of Clay Wares," J. W. WRIGHT, Bureau of Standards.

"Hydraulic Properties of the Calcium Aluminates," P. H. BATES, Bureau of Standards.

"Electrical Resistance of Porcelains at Temperatures up to 800°C.," A. V. BLEININGER, Bureau of Standards.

Members desiring to become affiliated with the above Section should communicate with the Secretary, F. H. Riddle, Bureau of Standards, 40th and Butler Sts., Pittsburgh, Pa.

The Twenty-Fifth Anniversary Meeting

Sidney Dale Kirkpatrick will deliver the principal address.

Mr. Kirkpatrick, a chemical engineer and editor, was born in Urbana, Ill., April 2, 1894, the son of Frederick Dilling and Virginia Mae (Hedges) Kirkpatrick. He received the degree of Bachelor of Science at the University of Illinois in 1916 and took graduate work in 1916 and 1917.

During his professional career, he has served as chemist and editor, Illinois State Water Survey, 1916–1917; chemical adviser, U. S. Tariff Commission, 1917–1918; special expert with this same Commission, 1919–1921; and has been with the McGraw-Hill Book Co., New York, N. Y., since 1921 as assistant editor, *Chemical & Metallurgical Engineering* (1921–1925), associate editor (1925–1928), and editor (1928). He also has been consulting editor of a chemical engineering series of text and reference books since 1928 and in 1933 was editor of Twenty-Five Years of Engineering Progress. He is a director of the McGraw-Hill Book Company and has been vice-president of the National Conference of Business Paper Editors since 1940.

During the First World War, he served as a Second and First Lieutenant in the Sanitary Corps of the A.E.F. (1918–1919) and acted as chemical adviser to the American Commission to Negotiate Peace in 1919.

Mr. Kirkpatrick is a member of the American Institute of Chemical Engineers (director, 1932–1939; vice-president, 1940–1941; and president, 1941), the American Electrochemical Society (director, 1933–1935; vice-president, 1931–1935), the American Chemical Society (councillor, 1939), Sigma Xi, Phi Lambda Upsilon, Alpha Chi Sigma, Sigma Delta Chi, and Theta Delta Chi. He was awarded the silver anniversary medal by the American Institute of Chemical Engineers in 1932.

Sidney Dale Kirkpatrick

He is trustee of the Chemists Club and a member of the Western Universities Club.

His home is at 52 Woodcrest Ave., Millburn, N. J., and his office is at 330 W. 42d St., New York, N. Y.

* From *Jour. Amer. Ceram. Soc.*, **1** [10] 736 (1918).

CREED OF THE INDIVIDUAL

WITH FREE ENTERPRISE

(a) One must earn a character, (b) acquire credit, (c) avoid loss, (d) be useful to others, and (e) strive to do better.

WITH SOCIALIZED REGIMENTATION

(a) Personal character is not valued, (b) one need not be concerned about debt, (c) one can waste as much as his inherent laziness may dictate, (d) one need not consider others, and (e) one must force others deeper into passivity of planned existence.

MAY OUR INDIVIDUAL CREED BE COOPERATION IN FREE ENTERPRISE ACTIVITIES

Suggested by article in *Nation's Business*

Should Industry Support the Science Mobilization Bill?

A SUMMARY OF THE ARGUMENTS

YES *says* SENATOR HARLEY M. KILGORE, *the bill's author, because—*

1. All-out technological mobilization is needed tow in the war. Present governmental agencies are not doing the whole job, and industry is not totally mobilized for war, despite its protestations.

2. Wartime allocation of scientific personnel is vitally needed.

3. Government initiative should step in to spread techniques and encourage the use of war substitutes.

4. Patent control is needed to prevent further growth of monopolies now and in the years after the war.

NO *says* JOHN W. ANDERSON, *Gary, Ind., industrialist, because—*

1. The bill is not needed—success at the battlefronts is testimony to industry's full mobilization for war.

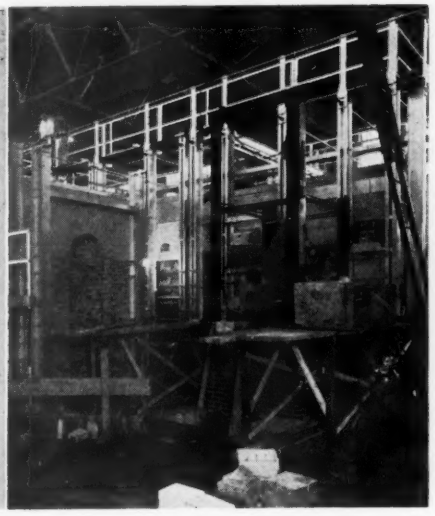
2. Powers given the "Administrator" would make him a virtual dictator to all industry.

3. Scientific research would be thrown under bureaucratic control; technical personnel would be treated as puppets.

Reprinted from *Modern Industry*, September 15, 1943

Follow through

PLAY SAFE



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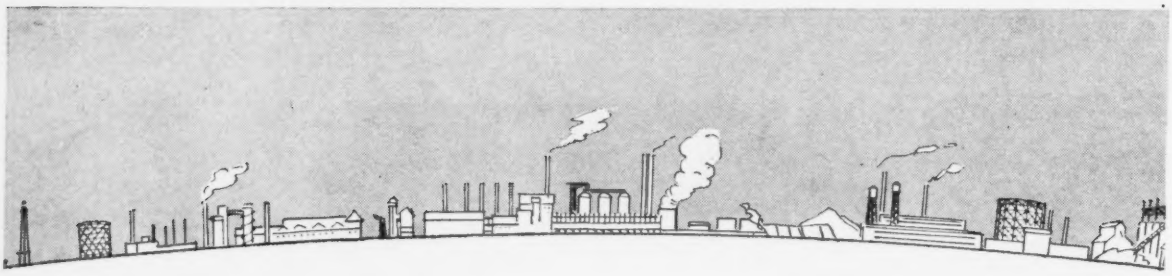

LISTENING IN ON INDUSTRIAL AMERICA

WITH "ears" as big as those of a listening post at the battle front we are catching sounds of a stirring, restlessly active industry—the sounds of plan making for the world stimulating changes of the coming post war era.

New processes, new materials and new equipment are already being developed and perfected to provide for a far higher standard of living. Many of these will be out-growths of developments born of war's necessities in which specialized refractories by Carborundum have played such an important part.

Take synthetic rubber for example. In certain processes "Carbofrax," with its high refractoriness, low spalling tendency and high thermal conductivity has helped to make higher production possible.

The unusual properties of "Carbofrax" are likewise utilized to excellent advantage in the manufacture of some of the materials required in synthetic rubber products to give them the desired characteristics.

In one method by which magnesium is produced, the highly corrosion resistant refractory "Monofrax" plays a vital role. Another magnesium process requires the use of "Carbofrax" because of its high strength at elevated temperatures and rapid heat conductivity.

In the production of zinc and molybdenum the unique properties of "Carbofrax" are again of tremendous importance in increasing output—reducing operating costs.

Thus, it is by no means surprising that we have our ears tuned to the plans for tomorrow—listening for word of new processes in which the use of Carborundum Brand Super-Refractories will undoubtedly prove of great value.

If your process—either present or planned—presents a refractory problem, we would welcome an opportunity of discussing it with you.

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THE CARBORUNDUM COMPANY • PERTH AMBOY, N. J.

REG. U. S. PAT. OFF.

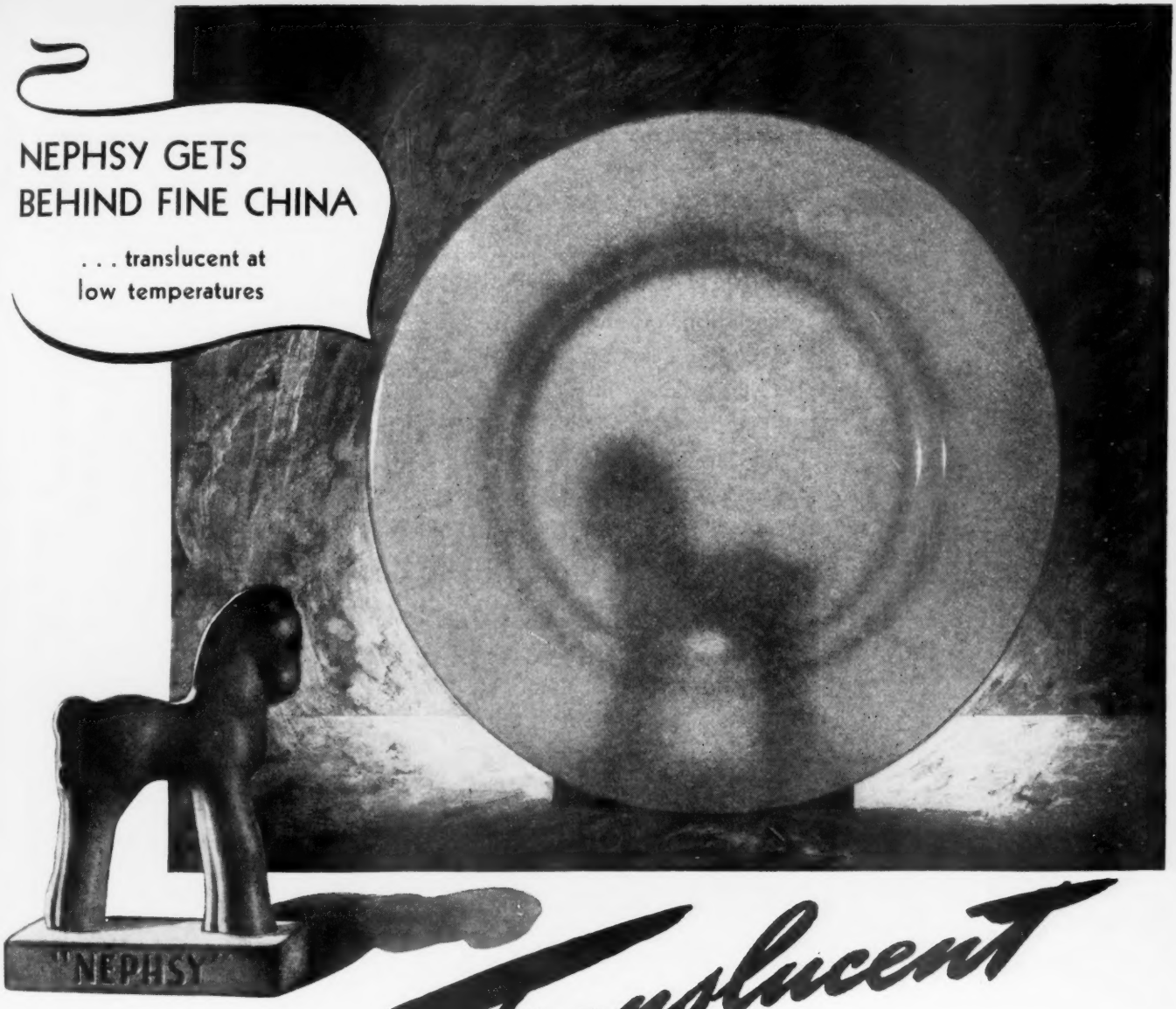
Refractory Division

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

(Carborundum, Carbofrax and Monofrax are registered trade-marks of and indicate manufacture by The Carborundum Company)

NEPHSY GETS
BEHIND FINE CHINA

. . . translucent at
low temperatures



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bodies with Lakefield NEPHELINE SYENITE at Cone 4 . . . . . .

Wide color ranges of glazes and bodies are possible at Cone 4 with Lakefield NEPHELINE SYENITE. Fine dinnerware, so manufactured, is translucent.

Production advantages of these new bodies include—reduced firing time—good firing range—warpage greatly reduced—lower fuel cost in both bisque and glost firing—reduced upkeep cost on kiln and kiln furniture.

Write us for information concerning the new low temperature abrasion and corrosion resistant glazes developed by our research department. These glazes contain available oxides and make possible two-fired ware of fine quality.

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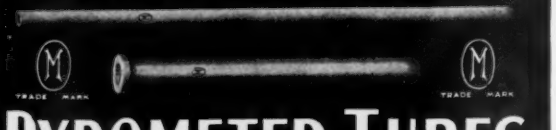

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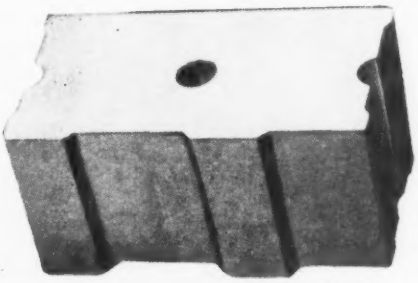

One of many designs

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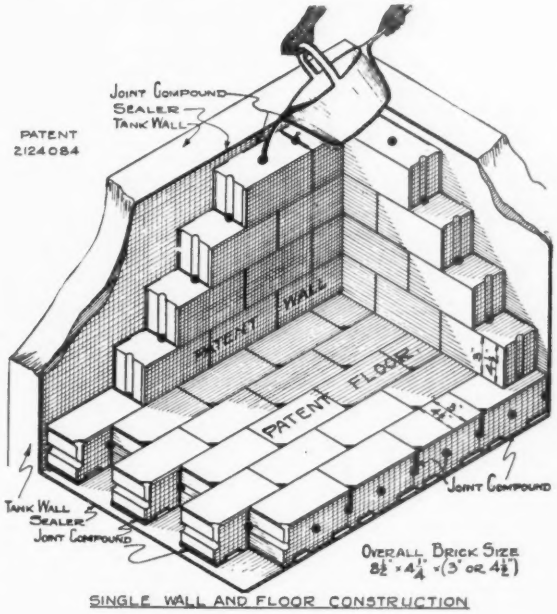

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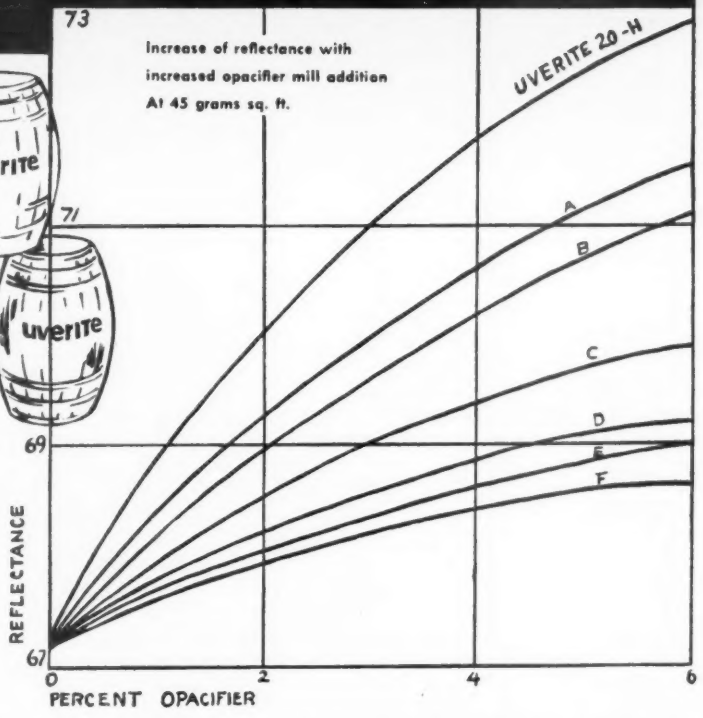
Why UVERITE

STANDS OUT AMONG MILL ADDITION OPACIFIERS

FOR PORCELAIN ENAMEL



***Opacifier Reflectance Tests**

Opacifier	2%	4%	6%
Uverite 20-H	70.0	71.9	72.9
A	69.2	70.9	71.9
B	69.0	70.2	71.3
C	68.6	69.4	70.2
D	68.0	68.6	69.2
E	67.8	68.5	69.1
F	67.7	68.2	68.7

The opacifier reflectance tests recorded on the chart above and in the percentage table* are the results of comparative tests made between Uverite and each of six commonly used mill addition opacifiers designated as A, B, C, D, E and F. Each opacifier was added to the same typical super opaque frit.

The record above is not the only reason why Uverite can be of great help to you. Here are 7 additional reasons why more Uverite is used than any other opacifier:

1. **Costs no more than ordinary opacifiers . . . and actually you need less.**
2. **Shipments are prompt—deliveries unrestricted.**
3. **Produces better surface—fewer defects.**
4. **Color-controlled for better whites.**
5. **High purity and uniformity.**
6. **Large stocks are available.**
7. **Only opacifier based on Titanium-Antimony. (Patented)**

Many porcelain enamelers are reluctant to change methods. For that reason we are ready to furnish you with test reports on your present mill additions compared with Uverite. At the same time we will recommend the proper Uverite substitution. If you would like to make your own tests, order a trial lot or barrel.

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Abrasive Wheels: (Diamond impregnated for cutting off brittle materials)
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Aloxite (Refractory Products)
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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
The Vitro Mfg. Co.

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The Vitro Mfg. Co.

Aluminum Oxide (Calcine)
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The Vitro Mfg. Co.

Aluminum Oxide (Fused)
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Electro Refractories & Alloys Corp.
Foote Mineral Co.
Harshaw Chemical Co.
Norton Co.
The Vitro Mfg. Co.

Alundum (Refractory Products)
Norton Co.

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Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Solvay Sales Corp.

Ammonium Bifluoride
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Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

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The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

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Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Antimony Sulphide
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The Hommel, O., Co., Inc.

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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.

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Lancaster Iron Works, Inc.

Ball Mills
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
McDanel Refractory Porcelain Co.
The Vitro Mfg. Co.

Ball Mills (Laboratory Type)
Drakenfeld, B. F., & Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
The Vitro Mfg. Co.

Barium Carbonate
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Basic Oxides
Porcelain Enamel and Mfg. Co.

Batch Systems
Frazier-Simplex, Inc.
Lancaster Iron Works, Inc.
National Engineering Co.

Batts
Carborundum Co. (*"Carbofrax Aloxite"*)
Electro Refractories & Alloys Corp.
Norton Co. (*Alundum-Crystolon*)

Bentonite
Hammill & Gillespie, Inc.

Beryl
Foote Mineral Co.

Bichromate of Soda
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Bitstone
Potters Supply Co.

Blades: (Diamond impregnated for cutting glass, tile, quartz, ceramics, Vitreous Products)
Felker Mfg. Co.

Blocks (Refractory)
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P., Fire Brick Co.
Norton Co.
The Vitro Mfg. Co.

Body Stains
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Bone Ash
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Borax
American Potash & Chemical Corp.
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Borax Glass
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co. Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Boric Acid (Anhydrous)
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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Boric Acid (Crystal, Granular, or Powder)
American Potash & Chemical Corp.
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pacific Coast Borax Co.
Stauffer Chemical Co.
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Boron Carbide
Norton Co.

Brick Machines (also Barrows, Molds)
Lancaster Iron Works, Inc.

Brick (Refractory)
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Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P., Fire Brick Co.
Norton Co.
The Vitro Mfg. Co.

Cadmium Sulphide
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Carbofrax (Refractory Products)
Carborundum Co.

Carbonates (Barium, Lead)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Castings
Lancaster Iron Works, Inc.

Caustic Potash
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Solvay Sales Corp.

Caustic Soda
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.
Stauffer Chemical Co.
The Vitro Mfg. Co.

Cements
Carborundum Co
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P., Fire Brick Co.
Norton Co.
Pennsylvania Salt Mfg. Co.
Saureisen Cements Co.

Ceramic Chemicals
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Pennsylvania Salt Mfg. Co.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Cerium Oxide
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Foote Mineral Co.

Chromite (Natural Chromate of Iron)
Foote Mineral Co.

Chromium Oxide
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Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

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Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Kentucky Clay Mining Co.
Maxson, Elwyn L.
Potters Supply Co.
Spinks, H. C., Clay Co.
The Vitro Mfg. Co.

Clay (Bentonite)
American Colloid Co.
Foote Mineral Co.
Great Lakes Foundry Sand Co.

Clay (Block)
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Clay (China)
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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
The Vitro Mfg. Co.

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Clay (German Vallendar)
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Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Kentucky Clay Mining Co.
Porcelain Enamel and Mfg. Co.
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Great Lakes Foundry Sand Co.

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Spinks, H. C., Clay Co.

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The Hommel, O., Co., Inc.
Kentucky Clay Mining Co.
Maxson, Elwyn L.
Spinks, H. C., Clay Co.

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Georgia Kaolin Co.
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Maxson, Elwyn L.
Potters Supply Co.
Spinks, H. C., Clay Co.

Clay-Slip (Albany)
Hammill & Gillespie, Inc.

Clay (Wad)
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Potters Supply Co.
Spinks, H. C., Clay Co.

Clay (Wall Tile)
Hammill & Gillespie, Inc.
Kentucky Clay Mining Co.
Maxson, Elwyn L.
Spinks, H. C., Clay Co.

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Porcelain Enamel and Mfg. Co.

Cleaners, Chemical
Harshaw Chemical Co.
Pennsylvania Salt Mfg. Co.

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Leeds & Northrup Co.

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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
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Harshaw Chemical Co.
The Hommel, O., Co., Inc.

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The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

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Cones
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Harshaw Chemical Co.
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Corhart
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Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.

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Norton Co.
Potters Supply Co.

Crushers (Clay)
Lancaster Iron Works, Inc.

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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
The Vitro Mfg. Co.

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Norton Co.

Cullet, Washing Plants, Incinerators, Crushers
Frazier-Simplex, Inc.

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Industrial Ceramic Products, Inc.

Cutters: Diamond impregnated wheel type
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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

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National Engineering Co.

Draft Gauges, Recorder-Indicating
Hays Corp.

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Lancaster Iron Works, Inc.

Dryers (Waste Heat, Continuous and Batch Type)
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Lancaster Iron Works, Inc.
Proctor & Schwartz, Inc.

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Corhart Refractories Co.

Enamelers' Borax
Porcelain Enamel and Mfg. Co.

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Ingram-Richardson Mfg. Co. of Indiana, Inc.
The Vitro Mfg. Co.

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The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Lancaster Iron Works, Inc.
Norton Co.

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American Rolling Mill Co.

Enameling Muffles
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Frazier-Simplex, Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Norton Co. (*Alundum*)

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Ingram-Richardson Mfg. Co. of Indiana, Inc.
Metal & Thermit Corp.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Enamels
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Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Enamel Oxide
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.

Enamels (Porcelain)
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Engineering Service
Harrop Ceramic Service Co.

Equipment (Porcelain Enameling)
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.

Feldspar
Abingdon Sanitary Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Filter Fabrics
Metakloth Company

Fire Brick
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P., Fire Brick Co.
Norton Co.

Fire Brick—Process Equipment
Lancaster Iron Works, Inc.

Fire Clay
Great Lakes Foundry Sand Co.
Spinks, H. C., Clay Co.

Flint
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Great Lakes Foundry Sand Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
Porcelain Enamel and Mfg. Co.

Flint Pebbles
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
The Vitro Mfg. Co.

Floors (Non-Slip)
Norton Co.

Fluorspar
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

French Flint
Maxson, Elwyn L.

Frit
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Frosting Mixtures
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Fuel Oil Systems and Control Stokers
Frazier-Simplex, Inc.
Harrop Ceramic Service Co.

Furnaces
Carborundum Co. (*Carboradient*)
Frazier-Simplex, Inc.
Harrop Ceramic Service Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Swindell-Dressler Corp.

Furnaces, Enameling
Swindell-Dressler Corp.

Gauges, Draft (Recording, Indicating)
Hays Corp.
Leeds & Northrup Co.

Gauges, Flow (Air and Gas)
Hays Corp.

Gauges, Pressure
Hays Corp.
Leeds & Northrup Co.

Gauges, Ratio (Flows)
Hays Corp.

Glass Bending Ovens, Glass Decorating Machines
Frazier-Simplex, Inc.

Glass Equipment
Lancaster Iron Works, Inc.

Glass Melting Tanks and Furnaces
Frazier-Simplex, Inc.

Glass Sand
Great Lakes Foundry Sand Co.

Glass Thickness Gauge
Bausch & Lomb Optical Co.

Glaze and Body Spar
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Glazes and Enamels
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Glaze Spar
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.

Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.

Goggles
The Hommel, O., Co., Inc.

Gold
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Gold Decorations
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Granulators
Lancaster Iron Works, Inc.

Grinding Wheels
Carborundum Co. (*Carborundum and Aloxite*)
Electro Refractories & Alloys Corp.
Norton Co. (*Alundum-Crystolon*)

Hearths
Carborundum Co. (*Carbofrax* heat treating)
Corhart Refractories Co.
Norton Co. (*Crystolon*)

Hearths (High Aluminous Clay, Electrically Sintered Aluminum Oxide, Silicon Carbide)
Carborundum Co.
Norton Co.

Hydraulic Propellers
Denison Engineering Co.

Hydrofluoric Acid
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Ilmenite
Orefraction, Inc.

Iron Chromite
Harshaw Chemical Co.

Iron (Enameling)
American Rolling Mill Co.

Iron Oxide
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.
The Vitro Mfg. Co.

Kaolin
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
The Vitro Mfg. Co.

Kilns, China (Decorating)
Drakenfeld, B. F., & Co.
Frazier-Simplex, Inc.
Harrop Ceramic Service Co.
The Hommel, O., Co., Inc.
Swindell-Dressler Corp.

Kilns (Electric, Circular, Tunnel)
Harrop Ceramic Service Co.
Swindell-Dressler Corp.

Kiln Furniture (Silicon Carbide, Semi-Silicon Carbide) (Refractory)
Carborundum Co.
Electro Refractories & Alloys Corp.

Kryolith (see Cryolite)
Pennsylvania Salt Mfg. Co.

Laboratory Ware
Norton Co.

Lehr Tile (High Aluminous Clay, Electrically Sintered Aluminum Oxide, Silicon Carbide)
Carborundum Co.
Electro Refractories & Alloys Corp.

Lehrs
Frazier-Simplex, Inc.
Swindell-Dressler Corp.

Lehrs (Electric or Fuel Heated)
Frazier-Simplex, Inc.
Swindell-Dressler Corp.

Lehr Loaders
Frazier-Simplex, Inc.

Linings (Furnace Refractory, Block Refractory Plate, Brick, and Tile)
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P., Fire Brick Co.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Norton Co.
The Vitro Mfg. Co.

Lithium Carbonate
Drakenfeld, B. F., & Co.
Foote Mineral Co.

Lithium Minerals
Foote Mineral Co.

Loaders (Bucket)
National Engineering Co.

Magnesia (Fused)
Electro Refractories & Alloys Corp.
Norton Co.

Magnesia (Sintered, Calcined)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Porcelain Enamel and Mfg. Co.

Magnesite
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Magnesite Calcined
Foote Mineral Co.
The Hommel, O., Co., Inc.

Magnesium Carbonate
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Manganese
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Manganese Dioxide
Drakenfeld, B. F., & Co.
Foote Mineral Co.

Manganese (Oxide)
Corhart Refractories Co.
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Masks (Breathing)
Drakenfeld, B. F., & Co.

Metals (Porcelain Enameling)
American Rolling Mill Co.

Micronized Products
Porcelain Enamel and Mfg. Co.

Microscopes (Polarizing)
Bausch & Lomb Optical Co.
Spencer Lens Co.

Microscopes (Stereoscopic)
Bausch & Lomb Optical Co.
Spencer Lens Co.

Minerals
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Orefraction, Inc.
The Vitro Mfg. Co.

Mixers
Clearfield Machine Co.
National Engineering Co.

Mixers (Batch)
Clearfield Machine Co.
Lancaster Iron Works, Inc.
National Engineering Co.

Mixers (Concrete, Paving, Road Paving, Plaster, Asphalt, Truck, Mortar, Bituminous)
Lancaster Iron Works, Inc.

Mixers (Laboratory)
Lancaster Iron Works, Inc.
National Engineering Co.

Mold Sanders
Lancaster Iron Works, Inc.

Muffles (Furnace) (Laboratory)
Carborundum Co. (*Carbofrax*)
Electro Refractories & Alloys Corp.
Frazier-Simplex, Inc.
Norton Co.

Mullers (Batch)
Clearfield Machine Co.
Lancaster Iron Works, Inc.
National Engineering Co.

Muriatic Acid
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.

Needle Antimony
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Nepheline Syenite
Great Lakes Foundry Sand Co.

Nickel Salts
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Nitrates (Cobalt, Sodium)
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc. Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Nitre
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Norbide (Norton Boron Carbide)
Norton Co.

Olivine
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.

Opacifiers
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Metal & Thermit Corp.
Pennsylvania Salt Mfg. Co.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Overglaze Colors
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.

Oxides
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Metal & Thermit Corp.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Palladium Decorations
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Pans—Wet and Dry
Clearfield Machine Co.

Pins
The Hommel, O., Co., Inc.
Industrial Ceramic Products, Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Potters Supply Co.

Placing Sand
Great Lakes Foundry Sand Co.

Platinum Decorations
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.

Polariscopes
Bausch & Lomb Optical Co.
Frazier-Simplex, Inc.

Porcelain Enameling Service (Practical)
American Rolling Mill Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Porcelain Enamels
The Hommel, O., Co., Inc.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Porcelain Enamel and Mfg. Co.
Titanium Alloy & Mfg. Co.
The Vitro Mfg. Co.

Potash (Carbonate)
Du Pont de Nemours, E. I., & Co. Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Solvay Sales Corp.
The Vitro Mfg. Co.

Pressure Gauges, Tank
Hays Corp.

Producer Glass Plants
Frazier-Simplex, Inc.

Pug Mills
Lancaster Iron Works, Inc.

Pyrites (Natural Iron Sulphide)
Foote Mineral Co.
The Hommel, O., Co., Inc.

OPPORTUNITIES AVAILABLE
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- Positions are available for foremen, supervisors, and assistant superintendents in five refractories plants—one silica brick and one fire brick plant in Eastern United States; one fire brick plant in Missouri; one fire brick plant in Old Mexico; and one in South America.
- Past experience in refractories plants desirable, but not essential if have had thorough experience in manufacturing other heavy clay products.
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MEXICO, MISSOURI

For Better Refractories

"G-1 REFRACTORY WHITE CLAY"

Infallible for High-Duty Clay Refractories

- Great Refractoriness (Cone 34),
- High Plasticity,
- Enormous Load-Carrying Capacity,
- Good Resistance to Slagging and Corrosion.

Absolutely uniform and pure (Appr. 98% clay substance). A money-saver because of longer life through greater strength.

IN CLAY CASTING a small percentage of "G-1" added to body mix gives faster casting rates; eliminates drying and burning cracks; stabilizes the properties of casting slip, drying cast ware with more ease; and leaves cast ware in perfect, leather-hard condition with no "drooping" after mold is removed.

THIRTY years in successful, practical use—millions of tons available—furnished crude, air-dried, oven-dried, crushed, or pulverized. Prompt shipments, Georgia clay tariff rates.

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Savannah, Georgia

Mines: Gordon, Ga., on main line of Cen. of Ga. Ry.

CERAMIC ENGINEER, CHEMICAL ENGINEER OR CHEMIST

Long established New Jersey Manufacturer of Radio Parts is starting a new branch of ceramic capacitors for Radio, and requires man with experience to supervise the development of this new product.

Experience in manufacture of steatite and capacitors with Rutile bodies is highly desirable.

Permanent, post-war position. Write full details.

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Finely Prepared Feldspar

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Baltimore 2, Maryland

MILL—BEDFORD, VIRGINIA

POSITION OPEN

There is a permanent position open for a ceramic engineer to conduct glass research and factory quality control in a high-grade company of moderate size located in the Middle West. Give complete statement of qualifications. Address Box 233F, The American Ceramic Society, Inc., 2525 N. High St., Columbus 2, Ohio.

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FRENCH OR BELGIAN BURRSTONE

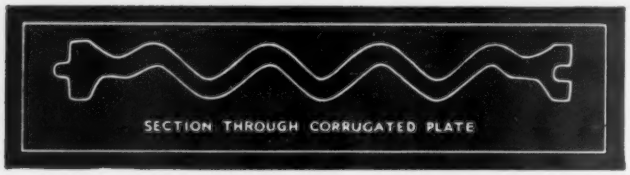
Can use any piece or pieces 4″ x 6″ x 8″ or larger.

IDEAL TOOTH, INCORPORATED
90 Hamilton St., Cambridge 39, Mass.

Improved Design of Refractory Shapes Benefits Operators of Enameling Furnaces

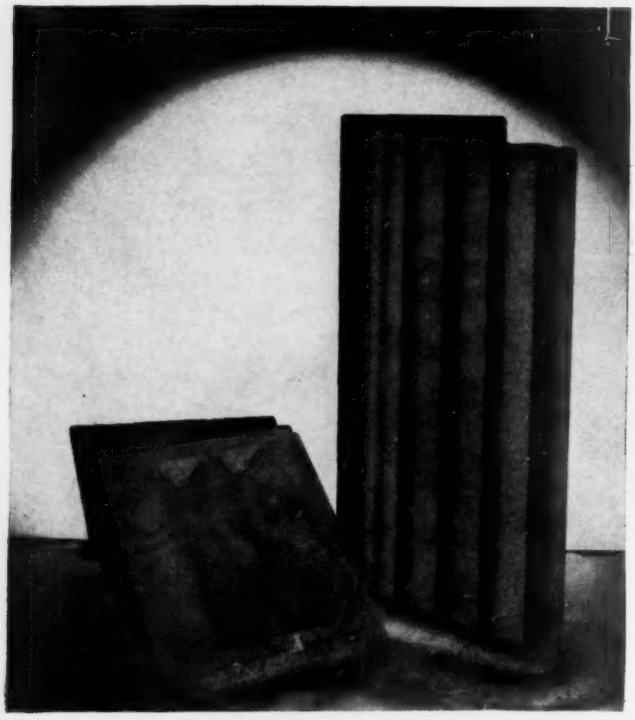
Improved design of refractory shapes has resulted in longer service and greater economy to users of enameling furnaces. Refractory tiles, called "muffle plates," protect the ware from the products of combustion. Here design becomes important immediately.

Assuming the heat conductivity of the muffle material as constant, there remain two important variables which directly affect furnace efficiency—the thickness of the refractory and the available surface radiation area.

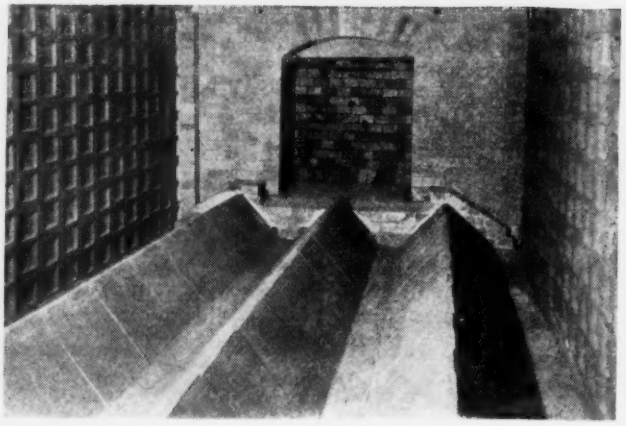


With regard to thickness, mechanical strength of the plates requires a design with sufficient cross-section or thickness to prevent distortion, especially in the heating or cooling cycles, or when the furnace is loaded with large amounts of cold ware.

The design of the corrugated muffle plate by Norton engineers accomplished two desirables at once. It enabled thinner cross-section to be utilized without decreasing mechanical strength, at the same time presenting 50% additional exposed plate area for dissipation of heat to the ware.

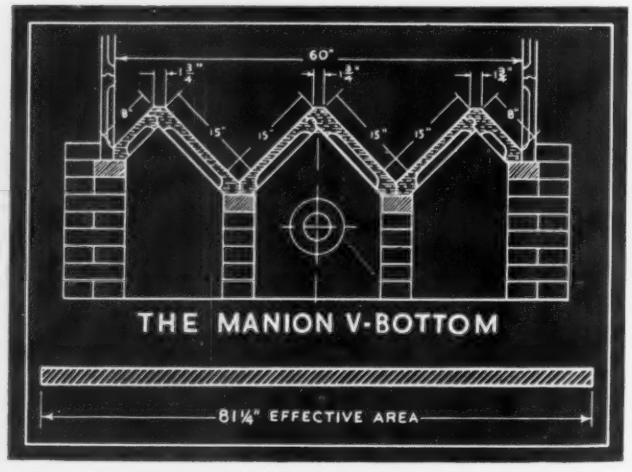


Typical Corrugated Muffle Plates



Manion V-Bottom in Enameling Furnace

The design of hearth plates is important to furnace operators. With horizontal plates the thickness must vary in proportion to the unsupported span. Just as was done through designing corrugated muffle plates—so in furnace bottoms, two desirable results were obtained through a single invention, the so-called V-bottom. The tile being at a 45 degree angle require 46% less cross-section thickness for equal strength. Furnace efficiency immediately increases and when these V plates are further decreased 50% in thickness by virtue of corrugation, yet with the same strength, furnace efficiencies can again be doubled.



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"World's Most Complete Ceramic Supplier"

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Colors & Oxides

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Equipment

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Silvakloth

(black)

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POTTERY FILTER FABRICS.

This finish gives the fabric a smooth, lustrous, metallic surface—no fibres to catch and break the clay cake as it comes away in one perfect piece—filters better and faster than untreated cloths—requires fewer washings and is easier to keep clean—more continuous operation of your press—lower labor costs and a larger and better product with the same machinery.

The fabric is mildew proofed—has an increased tensile strength—has a longer useful life.

This means larger profits for you.

Consult your bag manufacturer or write to.

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Pyrometer Tubes
Carborundum Co.
Leeds & Northrup Co.
Montgomery Porcelain Products Co.

Pyrometer Tubes (Refractory and Hard Porcelain)
Electro Refractories & Alloys Corp.
McDanel Refractory Porcelain Co.
Montgomery Porcelain Products Co.
Norton Co.

Pyrometers (Optical, Radiation, Surface, Immersion, Needle)
Leeds & Northrup Co.

Pyrometric Cones
The Edward Orton, Jr., Ceramic Foundation

Raw Material Handling Equipment
Frazier-Simplex, Inc.
Lancaster Iron Works, Inc.

Recorders, CO_2
Hays Corp.
Leeds & Northrup Co.

Recorders, Draft
Hays Corp.
Leeds & Northrup Co.

Recorders, Tank Pressure
Hays Corp.
Leeds & Northrup Co.

Refractometers
Bausch & Lomb Optical Co.
Electro Refractories & Alloys Corp.
Spencer Lens Co.

Refractories
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P. Fire Brick Co.
Norton Co.

Refractory Materials
Carborundum Co.
Corhart Refractories Co.
Electro Refractories & Alloys Corp.
Green, A. P. Fire Brick Co.
Norton Co.
Titanium Alloy & Mfg. Co.

Respirators
Drakenfeld, B. F., & Co.
The Hommel, O., Co., Inc.

Rutile
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Orefraction, Inc.
The Vitro Mfg. Co.

Saggers
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.
Potters Supply Co.

Salt Cake
American Potash & Chemical Corp.
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.

Sandblast Sand
Great Lakes Foundry Sand Co.

Sand Grinders and Sifters
Lancaster Iron Works, Inc.

Saponin
The Hommel, O., Co., Inc.

Saws: Diamond impregnated for cutting off
Felker Mfg. Co.

Screening and Magnetic Separators
National Engineering Co.

Selenite of Sodium
Drakenfeld, B. F., & Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Selenium
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel O., Co., Inc.
The Vitro Mfg. Co.

Sheets (Enameling Iron)
American Rolling Mill Co.

Silica (Fused)
Electro Refractories & Alloys Corp.
Foote Mineral Co.
The Hommel, O., Co., Inc.

Silicate of Soda
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Silicon Carbide
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Silicon Carbide Firesand
Carborundum Co.

Sillimanite Refractories
Electro Refractories & Alloys Corp.

Slabs (Furnace)
Carborundum Co.
Electro Refractories & Alloys Corp.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Norton Co.

Soda Ash
American Potash & Chemical Corp.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.
The Vitro Mfg. Co.

Sodium Antimonate
Drakenfeld, B. F., & Co
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Sodium Fluoride
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Sodium Metasilicate
Harshaw Chemical Co.

Sodium Nitrite
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Sodium Silica Fluoride
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Sodium Uranate
Drakenfeld, B. F., & Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.

Soot Blowers
Frazier-Simplex, Inc.

Special Machines
Frazier-Simplex, Inc.

Spar
Abingdon Sanitary Mfg. Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Maxson, Elwyn L.
The Vitro Mfg. Co.

Spray Booths
The Hommel, O., Co., Inc.

Spraying Equipment
The Hommel, O., Co., Inc.

Spurs
Potters Supply Co.

Stacks
Lancaster Iron Works, Inc.

Steel Plate Construction
Lancaster Iron Works, Inc.

Stilts
The Hommel, O., Co., Inc.
Industrial Ceramic Products, Inc.
Potters Supply Co.

Sulfur
Stauffer Chemical Co.

Sulfuric Acid
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Stauffer Chemical Co.

Talc
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
International Pulp Company

Tank Pressure Controllers
Hays Corp.

Tanks
Frazier-Simplex, Inc.

Tank Blocks
Corhart Refractories Co.

Tanks (Pickle)
The Hommel, O., Co., Inc.

Tanks for Raw Material Steel or Concrete
Lancaster Iron Works, Inc.

Tile (Floor)
Norton Co.

Tile (Muffle)
Carborundum Co.
Electro Refractories & Alloys Corp.
Norton Co.

Tile (Refractory)
Carborundum Co., (*Carbofrax*)
Electro Refractories & Alloys Corp.
Green, A. P. Fire Brick Co.
Norton Co.

Tile (Wall)
Green, A. P. Fire Brick Co.

Tin Oxide
Drakenfeld, B. F., & Co.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
The Vitro Mfg. Co.

Titanium
Drakenfeld, B. F. & Co.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
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Hammill & Gillespie, Inc.
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Winding Drums
Lancaster Iron Works, Inc.

Zinc Oxide
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Harshaw Chemical Co.
The Hommel, O., Co., Inc.
The Vitro Mfg. Co.

Zircon
Foote Mineral Co.
The Hommel, O., Co., Inc.

Zirconia
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Foote Mineral Co.
Harshaw Chemical Co.
The Hommel, O., Co., Inc.
Metal & Thermit Corp.
Orefraction, Inc.
Titanium Alloy & Mfg. Co.
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